THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN

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DOROTHY EBEL HANSELL
Editor

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The Origin and Growth of Botanic Gardens

By H. W. Rickett

Based on a lecture given to the Philipstown Garden Club on May 14, 1956.

BEFORE ATTEMPTING to discourse on the history of botanic gardens, one must first decide what a botanic garden is, how it differs from gardens in general. What is a botanic garden?

I suspect that most of our neighbors in the Bronx would answer that it is a park wherein to walk your baby or your dog, to have picnics, and to look at beautiful flowers.

Yet in the basement of the so-called Museum Building of The New York Botanical Garden, you will find white-coated young men and women engaged in the care of hundreds of test-tubes plugged with cotton and the manipulation of balances and autoclaves. They are probably little concerned with dogs or babies and even less with flowers. What are they doing in a botanic garden?

You all know what a "garden" is—an enclosure in which plants are grown, whether for pleasure or for profit. But what about "botanic"? Well, botany is the scientific study of life as manifested in plants. So a botanic garden must be an enclosure where plants are grown for scientific study.

Let me digress a moment on this matter of botany. (I am a botanist, not a gardener.) It used to mean, and to many persons it still means, the collection and naming of wild plants. Botanists roamed the fields and woods with a tin can and a plant press and quarreled harmlessly about the Latin names to be affixed to their specimens. They still do. So what about the test-tubes? Well, bacteria and mildew also are plants; they are grown in glass vessels in laboratories, and *other* botanists devote themselves to studying them. And still other botanists have found it desirable and, indeed, necessary to study the anatomy of plants, and their physiology, their breeding, and their diseases. So botany has become allied to chemistry, and botanists are sometimes adept in the uses of the microscope and other instruments. All these things, therefore, are properly in the province of a botanic garden. A botanic garden is an enclosure where plants are grown for scientific study.

Actually no botanic garden is so austere. In the Bronx, as in St. Louis and Kew, the garden is frequented by many who care little for science. They enjoy plants—and especially flowers—for their beauty or for the pleasures of gardening. So they are more interested in the horticulture which maintains the garden than in its ulterior purposes; and it becomes a function of the garden to apply the findings of science to horticulture and to train people in the operations of horticulture. Horticultural displays and instruction take their place with botany in botanic gardens, and have contributed to their growth.

With some such concepts in mind we may be able to distinguish, among all the gardens of history, those which can properly be termed botanic. In tracing the origin and growth of botanic gardens, we must look for evidences of research and instruction in botany, rather than losing ourselves in the history of horticulture. And we must be prepared to find a variety of subjects treated as botany.

There were well-cultivated gardens in Egypt at least five thousand years ago. There were private gardens with flowers, fruits, and vegetables; and there were famous temple gardens, as at Karnak, planted by the Pharaoh, with rare trees introduced from distant lands. But I doubt if there was anything that could be called a botanic garden. The first botanists of whom we have knowledge were Aristotle and his pupils, who lived about two thousand years ago. Theophrastus, whose books on botany we still have, is said to have had a garden. He certainly had a wide acquaintance with plants of many lands, and with their uses; and may well have grown many of them in a garden. But just what form the garden took and how it served botany we do not know. It is said that a certain rich man provided the funds for it, and was thus the first recorded patron of botany.

The Romans are well known to have had extensive and beautiful gardens connected with their luxurious villas. In them horticulture was highly developed; but there is no record of their use for scientific purposes. The Roman botanists were compilers rather than investigators.

In medieval Europe, the immediate ancestor of our own civilization, the first scientific study of plants centered about their medicinal uses. Before modern bacteriology and physiology, the art of healing depended mostly on medicines, whose workings were generally not understood but which were sometimes effective. Most of the medicines were derived from plants, gathered wild or grown in the herb garden; it was important to know the plants and to have names for them. So the herb gardens of the monasteries, in which learning survived during the "dark ages," became used for the instruction of future physicians: they were perhaps the first botanic gardens. The knowledge that emanated from them was collected in books, the herbals; at first in manuscript, later in printed books. The great herbals of Brunfels, Bock, and Fuchs in the sixteenth century were the first textbooks of botany; and the gardens which such men cultivated were botanic gardens.

In this same century, which was the time of the Renaissance, the rebirth of learning, the universities began to venture into natural science. In 1533 Francesco Bonafede, Professor of Medicine at the University of Padua, proposed that a *Lectura Simplicium,* a Lectureship of Simples, be established. (Simples were medicines composed of one simple ingredient, hence the herbs from which the medicines were made.) This is supposed to have been the first pro-

Plants are arranged formally according to a system of classification, for purposes of instruction, at the Botanic Garden of the University of Uppsala.

fessorship of botany in Europe. Probably Bonafede had a private garden of herbs to provide demonstrations for his classes. Then, ten years later, he suggested that such a garden be officially established. A decree of the Senate of the Republic of Venice instituted, 29 June 1545, the botanic garden of the University of Padua. This garden still exists, four hundred years later, about five acres in extent, with a collection of half a million preserved specimens of plants and a library of nearly fifty thousand books and pamphlets. It is said to have also seventeen fountains and a canal; its horticultural aspects have presumably not been neglected. The first director of the garden was Luigi Squalermo, also known, from his birthplace, as Anguillara; he had collected plants all around the Mediterranean, so the garden at Padua must have been well stocked.

Pisa contends with Padua for the honor of having had the first botanic garden; but the exact date is controversial. One authority says it was established by the Grand Duke of Florence, Cosimo dei Medici, in 1543; inspired by what was going on at Padua. It was apparently started in the garden of a convent. In the following year the nuns were transferred to another place, the old building was pulled down, and a new and larger botanic garden arose on the site. The famous Luca Ghini grew there the plants he collected in the Alps in 1544 and 1545: "a garden [to use his own words] which will delight your Excellency and prove of value to the students." Incidentally, the chair of botany had been offered in 1543 to Fuchs, who declined. Anguillara was Ghini's herbalist here before he went to Padua. In 1545 Ghini was commissioned by Cosimo to establish a botanic garden in Florence itself; which he did, near San Marco.

The idea spread rapidly. There had been an herb garden in Rome since the thirteenth century, but it was not used for study or instruction. About 1560, with botanic gardens, as it were, in the air, this old garden was placed in charge of Michele Mercati, one of the first pupils of the great botanist Andrea Cesalpino. This was at first in the Vatican, and stayed there until 1870. Bologna founded its botanic garden in 1567; the ubiquitous Ghini had lectured there previously. Outside of Italy, the first seems to have been that at Leiden, founded in 1587. This garden had one thousand species and varieties growing in 1594; and about the end of the century had six thousand cape plants under glass — perhaps the first botanical glasshouse. One laburnum tree of the original plantings was said to be still standing in 1935; it was fifty-seven feet high.

In England John Gerard had a famous garden in Holborn, dating from 1597; the plants which grew here were the basis for his well-known herbal. And he has the distinction of having issued propably the first catalogue of plants growing in a garden, in 1599. His was a private garden, but seems to have been open to visitors and certainly was used for botanical purposes; so it may be included here.

The next century, the seventeenth, saw the beginnings of some of the most celebrated botanic gardens. Perhaps the most famous was the Jardin des Plantes at Paris. It was established by Louis XIII in an edict registered in May 1635; and was known at first and for one hundred and fifty years thereafter as the Jardin du Roi. Its beginnings were due to the representations of the King's First Physician, Hérouard, in 1626. Eighteen hundred species and varieties were planted by Jean Robin, Herbalist to the King. The garden was opened to the public in 1640. The scale was ambitious: there were, besides the Intendent, three professors of botany, anatomy, and chemistry. In 1660 botanical paintings on vellum were made by Robert, followed by Joubert and Aubriet: the beginnings of the remarkable series of such paintings which included the work of Bessa and the brothers Redouté.

In London the Society of Apothecaries had a garden in Westminster, visited by John Evelyn in 1658. In August 1673 the Society took a lease of land by the river in Chelsea for the construction of a barge-house: all the "companies" or guilds of London had their ceremonial barges. For this land they engaged to pay £5 a year for sixty-one years. Next year they built a wall around it and moved their herbs in. (Whether the barge-house was ever built or not I do not know.) This was the origin of the famous Chelsea Physic Garden, which still flourishes on the same spot. In 1682 the Dutch botanist Hermann visited it and arranged an exchange of plants. It was seen by Evelyn in 1685, who said it contained many simples. Sir Hans Sloane, himself a distinguished (and wealthy) physician and naturalist, purchased the manor in 1712, and on 20 February 1722 released the land to the Society for £5 a year "forever"; with the stipulation that fifty species of plants be given to the Royal Society annually until two

thousand plants had been given. The names of many famous botanists and collectors are connected with the Chelsea Garden. Philip Miller took charge of it in 1722, and issued the first catalogue of its plants in 1730, with five hundred species listed. In 1737 he brought out his famous *Gardeners dictionary*, the first of all such works, which went through ten editions. Greenhouses were built in 1732-1734. Linnaeus visited the garden in 1736—and Miller was one of the first in England to adopt the Linnaean nomenclature (1768). Other famous names associated with the Chelsea garden are William Curtis of the *Botanical magazine;* William Hudson, author of one of the first floras of England; William Forsyth, after whom *Forsythia* was named; John Lindley, who brought the "natural system" of classification to England; Robert Fortune, the great collector of Chinese plants.

And now we have passed into the eighteenth century, from which we can properly date modern botany. Up to this time botanic gardens had been really little more than herb gardens; the science taught was the recognition and the medicinal uses of herbs. In the late seventeenth century John Ray made a classification of plants. A system of classification is illustrated not only by living plants but by a herbarium of dried specimens. Ray's collections went to the Chelsea Physic Garden (and ultimately to the British Museum). In the eighteenth century other botanists became interested in classing plants into groups: the culmination of the movement was the great Linnaeus, with his twenty-four classes and numerous orders, all based on the numbers of stamens and pistils or styles. When, as Professor of Botany and Medicine in the University of Uppsala, he laid out a garden beside his house, he arranged the beds symmetrically to contain examples of the twenty-four classes; so that a visit to the garden was (and still is) like a walk through his book the *Genera plantarum*. The garden had been started nearly a century before by Rudbeck (from whom *Rudbeckia*, golden glow), doubtless on conventional lines. Linnaeus' garden was discontinued in 1807, when the University botanic garden was instituted. But the former has been restored in recent years for the edification of visitors. Here then we have a garden designed to illustrate a purely scientific concept and divorced from merely utilitarian arrangement.

In Paris, meanwhile, the great naturalist Buffon had taken charge; and in 1773 the garden was entirely replanted according to a new system. Linnaeus' classification was unsatisfactory in many ways; it was artificial; mints with two stamens, for instance, were placed in a different class from mints with four stamens. Bernard de Jussieu worked out a more "natural" system; afterwards expanded and improved by his nephew, Antoine-Laurent de Jussieu. Some of their "natural orders," such as the mints and the parsley group, are still among our "families." This system had been previously used in 1658 in the royal gardens at the Trianon, Versailles. The Linnaean nomenclature was, of course, retained. Here, then, was another garden which served as a demonstration of botanical science. Such collectors as Tournefort and Desfontaines brought in new species from distant lands. The Chevalier de Lamarck became the botanist at the garden about 1790. And at this time, when the Revolution suppressed the universities and faculties of medicine, the Jardin du Roi was merely renamed Jardin des Plantes and Muséum Nationale d'Histoire Naturelle. The menagerie was moved from Versailles in 1794, and, oddly enough, formed a part of the botanic garden. Finally Napoleon himself enriched the garden with plants collected by the savants attached to his expeditions.

The same period saw the establishment of "Kew Gardens." This botanical institution also had its origin in a royal garden. The village of Kew, with neighboring Richmond, had long been noted for the residences of celebrities and nobilities: William Turner, one of the greatest of herbalists, lived here; so did the painter Lely, and probably Gainsborough; Niepce, who helped develop photography, was another. Richmond Lodge was a royal residence from the time of George II, and his queen developed the "romantic" style of gardening here, with "Merlin's cave" and the "hermitage." In 1730 Frederick Prince of Wales leased Kew House and employed "Capability" Brown to develop the grounds; this garden became noted as a horticultural center, particularly under Princess Augusta, who carried on the work after her husband's death. George III united the Richmond and Kew properties; a small botanic garden, on the Linnaean system, formed part of the plantings. More and more exotic species were introduced, a "great stove," one hundred and fourteen feet long, was built, collectors

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Plants are arranged according to a system as in European gardens, but with an informal landscaping, at Beal Botanic Garden, Michigan State University.

One of the semi-circular paths of the main garden.

A WAY OF LIFE

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Rusticantur et Peregrinantur

By Irene Van de Water

IT IS PLEASANT to look back and recapitulate one's gardening experiences. The failures have been softened by time, but the successes remain. If I were to start all over again, I'm sure I'd go through the same phases. It is controversial to say that all beginners should start gardening by growing annuals, and yet it is good advice. In the first place, a new gardener, or even an experienced gardener starting a new garden in a different locality, must become well acquainted with the soil. Once its requirements are understood, half the battle is won. For this reason, it is sensible to start with annuals, which grow so quickly and act as indicators of the soil's fertility or deficiencies. Too much emphasis cannot be laid on soil tilth and a thorough knowledge of its behavior under all conditions.

For several years I grew as many kinds of annuals as I could get. "Liz" Bodgers of the California Bodgers Seed Company, who studied genetics at Cornell with me, was the source of many of the seeds I grew. Whenever I see the 'Golden Gleam' nasturtium, I am reminded of her gay, breezy ways, as it was the Bodgers who discovered this double nasturtium in Mexico, and so enriched our gardens and our lives. After growing annuals in all sorts of geometric patterns and color combinations, I then stepped up to perennials.

While growing annuals one can take the time to consider carefully where to plant the permanent things, such as trees, shrubs, bulbous plants, peonies, phlox, day-lilies, and iris. The most important plants, even including the lawn grasses, are the trees. One should give a great deal of thought to the correct kinds of trees and where to plant them around the house. And if, perchance, existing trees are unsightly and serve no useful purpose, it is not a crime to remove them. Driving around the country, one sees so many bad plantings due to too many or too large trees or shrubs. We reluctantly decided that a big maple in the front of the house had to be removed. While the bulldozer was taking it down, it was as painful to me as having a tooth pulled; but after it was gone — what a view we had, and what a relief to have that task done.

Since it takes years to grow a fine tree, it should be planted as soon as possible, as the years have a way of slipping by almost unnoticed in a garden. If one is in a hurry for trees, he may plant, as I did, those fast growers, the Lombardy poplar and the Japanese elm. After fifteen years the elms, due to their soft wood, are gone, decimated by the storms. For New York state conditions, I certainly cannot recommend this tree. About half the Lombardy poplars remain, some having grown to eighty feet in nineteen years. Disease took its toll, but those left are treasured for their stateliness and also as reminders of that row of huge Lombardy poplars which grew at Cornell.

When it comes to shrubs, where is one to draw the line? There are so many wonderful things to choose—for hedges, for foundations, for the birds, for fragrance, or for sheer beauty. And since we had over two hundred acres at our command, minus the apple orchards, it was indeed difficult for me to draw a line. For a time I wanted one of every kind of shrub I could acquire. Then it seemed desirable to put in a long row of lilacs, all different, of course. Then I had to grow many of the berried shrubs to encourage the birds. Roses, of course, are shrubs and how could I live without roses for beauty — or viburnums for fragrance?

When the desired trees were in—a little-leaved European linden, flowering crabs and evergreens—it was time to decide on the final size, shape and plan of the flower garden. Being city-bred, I

Dr. Irene Van de Water and Dr. Cynthia Westcott in the laboratory, Glen Ridge, New Jersey, 1933, when they started out jointly as "The Plant Doctor."

Verna, the author's daughter, rests on Mount Madison, New Hampshire.

was rather baffled by the amount of hard physical labor involved in establishing a permanent garden. However, just at this psychological point, I visited a neighbor and admired her charming rock garden made up of fine limestone rocks. Asking this small, elderly woman how the garden with these stones had been created, I was amazed to learn that she herself without much help had done it. This so inspired me that I went home determined to do the same. Over a period of years, I combed the old stone fences and selected flat rocks for the dry walls which I had decided to use in my hillside garden. As it now stands there are three semi-circular walls, each about fifteen inches high, with a bed six feet wide behind each one. Words alone cannot tell what a help and delight these walls have been through the years. How pleasant to sit on the edge and weed or smell a dianthus, or admire some choice little alpine gem at close range.

That word "alpine" brings up another phase of my gardening career. Dry walls are, of course, excellent places for rock garden plants. It follows naturally that I became an *aficionado* of these plants. Rock gardening is an acquired taste like olives. Did anyone ever get cured of a taste for olives, I wonder? For many years, the study and collecting of plants suitable for rock gardens have kept me happy and occupied. Since mountain climbing is one of our summer relaxations, it was an added incentive to get to the high mountains when the alpine flowers were in bloom. Our daughter, Verna, climbed her first mountain when she was eight years old; and Pal, the photogenic blonde cocker, was only six months old. Now that he is much older, he has his favorite sitting place in my garden, and just waits to have his picture taken. As a result of these mountain trips, such rare beauties as *Diapensia* have lived and bloomed and departed from my garden. *Vaccinium Vitis-idaea,* the mountain-cranberry, however, is still here and happy, I hope, as I have a proprietary interest in cranberries. When I worked at the Boyce Thompson Institute for Plant Research, it was my research problem to find out the cause of the "false blossom" disease of cranberries. By working in the cranberry bogs in New Jersey during two summers and in the greenhouses of the Institute in Yonkers during the winters, I was able to prove conclusively that this disease was due to a virus. It was carried by a small leafhopper, which I christened the "blunt-nosed leafhopper." Up to that time, the disease had been ascribed to physiological conditions. Now, whenever I see or eat cranberries, I naturally have a motherly feeling for them.

Being a member of the American Rock Garden Society has also helped augment the number of kinds of plants I grow. The society's Seed Exchange department is a marvelous service. As a result of it, I have grown many species of alliums from seed. Alas, most people sniff at alliums—just onions, to them. But how I love to call the roll of those resounding *Allium* names, to wit: *karataviense, Ostrowskianum, senescens glaucum, albopilosum, sikkimense, roseum grandiflorum* and *zebdanense*. They take me off, in my mind's eye, to far distant places and I long to be there, too, someday. *Allium azureum,* now blooming at my front doorstep, stops everyone coming in because of its out-of-the-ordinary form and its lovely blue color.

Pinks of the *Dianthus* genus are excellent for rock gardens and dry walls. They are cheerfulness and fragrance personified. They were well named

View facing due east of the iris in the second terrace—all yellow or bronze.

The author weeds the new south roadside terrace at ease, with "Pal" inspecting.

"flower of the gods." For several years I courted these elusive beauties. Why elusive? Because they are short-lived and must be renewed from seed. But yet, when many species are growing close together, they inter-marry most readily, and so one never knows what kinds of flowers will result. It seems to me that every pink plant in my garden is different. I remember with regret the many beauties that have come and gone during my gardening years. They always bring to mind the fact that once upon a time in the merrie England of John Gerard (1597), the pinks were in their glory, and I yearn to see those long-ago pinks, just as I often wish that Gerard himself could visit the gardens of today to see what we have done to improve his flowers.

Because my garden faces due north, it has a shorter growing period than other exposures near the house. This has several advantages as well as disadvantages. In the spring, tulips and narcissi can be obtained here a week to two weeks later than in the gardens of friends in nearby New Paltz. In the breeding of iris, of which I shall speak again, it is advantageous to grow clumps of the same iris both in the north-facing garden and at the south side of the house. By this means the blooming time of the same variety can be prolonged; and also those varieties which naturally bloom later than others can be made to bloom earlier in the southern exposure. The point of all this is to obtain the desired pollen at the necessary time. This problem has now been solved by "pollen banks." If I had a choice, my next garden would not face north but preferably southeast.

After many successes and failures with chrysanthemums, I have resigned myself not to grow them in my garden. For too many years the early frosts of September have wiped out all expectations. However, at the south side of the house, a rosy lavender unnamed variety has been thriving without any particular care for over twenty-three years, and blooming every year. Any chrysanthemum hybridizer interested in this variety may contact me. Everyone who has grown chrysanthemums knows the many pests to which they are heir. The expression "beginner's luck" certainly applies to anyone growing chrysanthemums in his garden for the first time. The true explanation is, of course, that the soil is not infected with those prevalent pests, the nematodes and the fungi of verticillium wilt and septoria leaf-spot which, with frosts, are the limiting factors in growing chrysanthemums.

And now the time has come to talk of—iris. It is the iris in all its species and varieties that is my first love, and I'm sure it will always be first. Why am I so sure? Because I hybridize them, and one lifetime is not long enough to satisfy any eager breeder. During the winter one dreams of those wonderful seedlings that are to bloom for the first time next spring. When they bloom, they have some flaw which must be corrected, so another batch of seeds is set and planted and then another two years must roll round till this generation blooms. Oh for a "time machine" which would telescope the time necessary to produce blooms, but not the lifetime of the hybridizer! Yes, hybridizing is the peak of gardening experiences. It is like living in the rarified air of alpine meadows, oblivious to the affairs of men below. Or as Walter Welch, of dwarf iris fame, puts it—hybridizing is to gardening as composing and playing one's own music is to playing some one else's music.

What is the fascination, what is the hold that the iris has over the four thousand addicts who belong to the American Iris Society? Once it was said that the iris was the "poor man's orchid," but that is not true these days. Some new introductions are priced at seventy-five dollars a rhizome. To keep one's garden supplied with the newer iris, one must buy not one but several dozens each year; more than five hundred varieties were introduced last year. Perhaps it is this infinite variety that keeps us so entranced with iris.

What do iris lovers do with all the iris they accumulate? Some grow them in beds of one color, as I do. Others grow them with many other kinds of plants, and so do I. One dyed-in-the-wool addict, a former president of the American Iris Society, has put every square foot of his grounds into iris

(Continued on page 141)

The author inspects a nice "fat" pod on a seedling iris.

Upper left
These hold us.

Lower left
This sold us.

Above
Dodge's miracle mulch.

HOBBY HOLLY

By **Ralph L. Dodge** *and* **Laurence F. Livingston**

WHEN RETIREMENT looms, a wise man, even though busy, stops to take stock of the situation and to lay plans to meet it. The following tells how and why we, the two authors of this article, chose holly culture as the answer to our retirement needs.

Dodge had evolved a retirement philosophy, labeled the "Three P's."

First, there must be no hermit-like withdrawal into a retirement shell; no sitting on the sidelines of life watching his former associates living; but there must be a continued *participation* with other human beings in some activity.

Second, that activity must be something that can be bragged about, displayed, and admired — something in which he could take *pride* in continuing accomplishment.

Third, he must have assurance that his activity was being appreciated by others. In what better way could he get this assurance than to have a *profit* possibility, however small? If your fellow men are willing to continue to pay hard cold cash for your output, you can be sure it's appreciated. The other candidate for the industrial shelf, Livingston, had a definite and quite similar philosophy of retirement, although it was more simply stated. He must continue to be active in a constructive manner. Although others may find rewarding satisfaction in diddling with postage stamps or dabbling with artists' brushes, Livingston's sighs of contentment would never arise from such boon-doggling hobbies.

Ten years of close association in small boating had indicated a high degree of compatibility between the two families. If any four people want proof of the compatibility pudding, let them try eating, sleeping, reading, and living together, days and nights at a time, in a hull, forty by ten by ten feet.

Another indication of mutuality of interest was evidenced by the fact that both families had aspirations for a retirement home in Maryland on the Eastern Shore of Chesapeake Bay.

Independent search, over a period of years, by each family had failed to uncover any desirable property within the definitely limited means of either. The whole area had been combed, with discouraging results, when an ideal place was advertised for sale. As is so often the case when a search has been extensive and futile, the object sought was finally found right under our noses.

This two hundred and thirty acre farm, with a half mile of shore frontage, was within a mile of the boat yard that had been our cruising headquarters for years. It was too costly for either of us to swing alone, but we could do it by pooling our assets—so we bought it on a partnership basis.

That was seven years ago.

The farm, in itself, was not a satisfactory solution to our retirement problems. It was, and most of it still is, an orthodox Eastern Shore tenant farm, operated by a tenant farmer. It might fill our *participation,* and perhaps our *pride* criteria, but there was no indication from the experience of others that it could ever be in the slightest degree *profitable.*

Yet we couldn't resist the sweep of the slope down to the shore. We felt certain that the elements that we required could be developed there by including holly as a prominent feature.

But why holly?

One of the partners, Livingston, had been raised in a section of the Pacific Northwest where holly is not only a thing of beauty and a joy forever, but is also a cash crop of considerable value.

In fact, he had participated in his youth in a profitable holly-growing venture run by his older brother. The memory of the beauty, charm and value of holly was revived, years later, in a talk with C. R. Wolf of Millville, New Jersey, followed by an inspection of Mr. Wolf's extensive plantings of *Ilex opaca.* The next step was attendance at a meeting of the Holly Society

Jerry executing.

of America, and then—holly for Sassafras Farm.

Following the freely given advice of such fine new friends as Mr. Wolf, Dan Fenton, Stewart McLean, and many others in the Holly Society of America, we started small. There were several good reasons for this.

First of all, we were unsure of ourselves, totally ignorant of modern holly culture, and completely unaware of the web of enchantment that holly can spin to ensnare people who are usually quite practical.

Then, there was the serious limitation of time. We did have a competent full-time caretaker, but there are many other jobs than holly connected with the care of two houses and their grounds. The tenant farmer had his own full-time job operating the corn-wheat-hay rotation that provided him with a living and us with the farm taxes. We two were still job-holders and had only weekends and vacations to spend, and not all of that on holly.

In addition, there was at that time a limitation of space. In the tenant farmer set-up most of the untilled land was used for pasture for the tenant's dairy herd, so that initially only about three acres could be dedicated to holly.

On it we put two hundred, two-year plants of *Ilex opaca, aquifolium,* and *cornuta* purchased from Stewart McLean's nursery at Towson, Maryland. With his help we proceeded to learn what we could about them. We read books, subscribed to journals, joined the Holly Society of America, listened avidly to lectures, and button-holed every person who even breathed the word "holly." All those thus accosted have been more than generous with their attention and advice. We couldn't have made even a small start without their help.

Now that retirement is a fact for both of us and the time limitation is not so acute, we find that the space limitation is also somewhat relaxed. You see, George, our tenant farmer, is growing older, too. He got tired of walking way over past our houses to herd his cows for milking, so he was quite willing to relinquish the thirty-acre shore tract to us to do with as we chose.

George . . . "Some trees die."

And we chose to fill it up with holly just as fast as our pensions will permit. We are buying new stock from time to time, but propagating as much as we can ourselves. Like all holly enthusiasts, we are even planning to raise a few seedlings in the fond hope that we may be lucky enough to produce a new and outstandingly desirable variety that we can market under our registered "Sassafras Farm" trademark.

Now that you know our amateur standing, it would be presumptuous for us to submit an article on "How to Raise Holly" to the readers of such a magazine as this. But we are already fairly well equipped by our experiences to date to tell you authoritatively and definitely how *not* to raise holly.

We have always tried to make the most of the help and encouragement that has been so freely given by fellow members of the Holly Society of America and others, but, even so, we have occasionally stumbled, either through ignorance or through haste.

By describing some of the pitfalls that lie in wait for any newcomers in this field of holly culture, and letting you read of some of our more spectacular mistakes, we can help those of you who are starting out as we did seven years ago.

Our first pitfall resulted from a failure to distinguish between quantity and quality — a mistake common to other avocations than holly culture. We had read in various publications that "holly likes shade."

Along one edge of our prospective orchard, previous owners had left a fine stand of trees from thirty to forty feet high, which offered noonday shade to several rows of our young holly trees, spaced on twenty-foot centers. We had set out our plants in September —some two hundred of them. The following summer saw them developing well, except three trees along the shaded edge of the orchard. They were definitely dead—all over.

We learned from a visit of one of our nurserymen friends that the quality of the shade is fully as important as the quantity. All three of the dead plants were within fifty feet of a large black walnut tree. Holly roots and black walnut roots are incompatible. We accept the verdict but wonder why.

It took George to point out to us the futility of expecting to get precise answers to all the many questions raised in our minds by our venture into this entirely new realm of horticulture. George, you remember, is our tenant farmer. He has farmed these same acres for thirty-five years. He has seen owners come and owners go—each with his pet hobby: alpine goats; blooded cattle; a yacht harbor; alfalfa; and now, momentarily in his book, we suppose, us with our holly.

We told George one day of the mysterious death of two more of our trees (not within a hundred yards of any black walnut). They had been fine,

Livingston's loving care.

three-foot specimens one weekend, and deader than two doornails two weeks later. George listened attentively to our tale of woe, nodded sagely, and announced ponderously, "Some trees die . . ."

We waited with bated breath for the revelation. "Some trees die—some people die, too!"

We hope that this was only George's way of telling us not to question too closely the way of the Almighty, and was not the subtly expressed wish of an annoyed tenant.

We think Jerry, our caretaker, who has much more reason to be annoyed at our hobby than George, expresses himself in a more kindly, but no less pointed way. Jerry has what might be called an executive job with us. He executes all the ideas we gather from books, lectures, and conversations. He slips, pots, digs holes, cultivates, waters, mulches, sprays, prunes, etc.

We took Jerry with us one day to Stewart McLean's nursery while we picked out a few more of Stewart's staminate studs and pistol-packing mama hollies. When we got home and Jerry had finished planting them with all the loving care we demand, we asked his opinion of Mr. McLean's orchard. Jerry allowed as how it was all right, but said quizzically, "He just sets 'em out and lets 'em grow."

Maybe we do kill our plants with kindness, but we love them so!

The propagating end of the business has its pitfalls, too. The first year after building a propagating bed, exactly according to Dr. Pease of West Virginia University's direction, as minutely detailed in its Circular #87, we set three hundred slips in late September. By May of the following year over half had successfully sprouted root clusters that would put Dr. Pease's photograph of a rooted slip to shame. They were definitely ready for potting.

On one of our many trips to gardens, or nurseries, or experiment stations or somewhere we had overheard that hen manure is a good source of acidic nitrogen for holly. Now we have never felt that we could afford to buy George's fresh eggs, but we did feel that, as owners, we were entitled to half of his hen manure, free. So we requisitioned a load of nice fresh manure and mixed it liberally in the potting mix. After Jerry had potted the one hundred fifty or so rooted slips, he moved them over to the slatted shelter to grow until the second following summer.

Only a moment went by before the acid test started to work on the potted holly. By fall we had left alive only about forty of the hardiest, most abuse-resistant holly plants on the Eastern Shore. Apparently we hadn't waited to hear the whole of the story about hen manure—"Well-rotted hen manure is a good top-dressing for mature holly trees, when sparingly used."

After this lesson, the next year's batch of five hundred slips had no trouble from too much fresh hen manure in the potting mix. They mostly died of something else, before we ever got to potting them.

Dr. Pease had said "locate the propagating bed in a shady spot." Now we had just such a spot between the cottage and the dog run, right close to a watering hydrant and under the shade of a big old tree.

We set the five hundred slips in late September, just as we had the year before. By December it was evident that in spite of the electrically warmed, fog-spray moistened sand, about two-thirds of them were sickly. By February they were no longer sick, they were dead—fit only for fireplace logs for a doll's house. The cause was now apparent. No! Our shade tree was *not* a black walnut tree. We had already learned that lesson, remember.

The sand in the propagating bed was interlaced with fine brown, hair-like roots, coming up from the bottom of the bed and spreading in all directions through the warm, moist sand. The tree was a weeping willow! What chance has a new, little, white holly rootlet against thousands of thirsty willow roots? Practically none, as we so clearly demonstrated.

If you ever feel an irresistible urge to build a propagating bed under a weeping willow tree, get a Navy surplus gun turret, invert it, and put your wet sand in that.

All these excusable errors of ours, and many others too stupid to bear telling, have only served to emphasize that for us to demand of our retirement hobby the three P's, *participation, pride,* and *profit,* is not enough. The holly hobby itself, like any other worthwhile effort, demands of its devotees a fourth P — *perseverance.*

A WAY OF LIFE (from page 138)

plantings. Another has torn up his handsome old front lawn and made straight rows of beds for his beloved iris. And I? Why my latest sacrifice to the goddess Iris is the front lawn and the roadside south of the house.

In 1935 it took long, painful, hand labor to create a terrace; in 1955, with a "bulldogger," as a friend aptly calls it, it was possible to get the terraces made in a couple of hours. Now we have two terraces as wide as the house, right under a fourteen-foot expanse of windows. Here the new iris will be given a place of honor, and they can be viewed from inside as well as from outside the house. The kitchen window, by the way, overlooks the main garden, and in this way is dish-washing made more bearable.

The new south terrace flanking the road was especially made for those apples-of-my-eye, the dwarf iris. I could wax lyrical about those plants. It took me many years to acquire some of the rare species for hybridizing. Once an eager amateur requested that I send her a dozen of my special pumilas, as she wished to hybridize with them. It so happened that I had four plants which had been obtained by fortunate contacts in Germany: much letter-writing and even praying had gone into the acquiring of those four plants. Now, however, thanks to Professor F. L. Randolph of Cornell we shall have a great many new species, varieties, and collected forms to mix into the chromosome pot. "Fitz," as we all affectionately call him, and his wife Fanny were commissioned by the American Iris Society to go abroad and collect iris, while in bloom, in their native habitats. Both the "Fitzes" were ideally suited for this assignment — and what treasures they brought back! Just as we are entering the Atomic Age due to the splitting of the atom, so in iris breeding we are entering a new era, due to the discovery and importation of the many new irises "Fitz" and Fanny brought back to this country. I can envision new colors, new patterns, new forms, new textures, new sizes and heights, and continuous blooming for the irises of the future. And what a headache this will be for the classification committee!

When one becomes a monomaniac, it also becomes necessary to find some

(Continued on page 156)

Old Tomes and Green Things Growing

A QUAKER DOCTOR'S TREASURES

By Betsy Copping Corner

(continued from July-August)

CHARLES DE L'ECLUSE led an adventurous life and in his travels mastered many languages which made him useful as a translator of foreign herbals. His first original work, published in 1576, resulted from a trip to collect plants in Spain and Portugal which he made with two students. Later, while employed by Emperor Maximillian II in Vienna where he remained fourteen years, L'Ecluse took advantage of the opportunity to explore the mountains of Austria and Hungary for botanical specimens. His finds were reported in a book appearing in 1583, which also recorded descriptions of oriental plants sent from Constantinople to Vienna. Dr. Fothergill had these two books and also the collected works of L'Ecluse, *Rariorum Plantarum Historia,* published in 1601 toward the end of the botanist's life while, as professor at Leyden, he was planning the arrangement of the university's garden. Plants in this garden he arranged according to botanical interest rather than for medicinal value, marking very early the separation which would come to pass between the two disciplines of study. Today Leyden's garden, much extended, contains in his memory a reconstruction of the smaller garden arranged exactly as he planned.

L'Obel like L'Ecluse studied medicine at Montpellier, but spent much of his life in England. His first book was dedicated to Queen Elizabeth I. Returning to the Low Countries, he served for a time as physician to William the Silent in Holland but appeared in England later to take charge of the medicinal garden in Hackney belonging to Lord Zouche and became botanist to James I. His chief work, owned by Dr. Fothergill, was *Plantarum seu Stirpium Historia,* 1576, incorporating earlier work in which he had first made known his new system for classifying plants by the characters of their leaves. This important book was translated into Flemish, and from Flemish into French by his friend L'Ecluse. As a tribute to L'Obel, Plantin then produced a book of illustrations without any text. It was an album full of the pictures made through the years for Dodoens, L'Ecluse, and L'Obel—and there were over two thousand of them—now arranged exactly according to L'Obel's new system of classification.

At this time Thomas Johnson in England was preparing an edition of Gerard's Herbal. Gerard had been much criticized both for the content of his book and its poor arrangement. Johnson, although only an apothecary, or perhaps because he was one, thoroughly overhauled the work of his countryman, quite transforming its original state of confusion through rearrangement and by eliminating certain features and adding others. The text was marked to indicate where changes had been made for the 1633 edition, the illustrations were taken from Plantin's album just mentioned, and a historical introduction was added. In spite of the shortcomings attributed to Gerard, it is pleasant to remember that he established a famous garden in Holborn where he made a careful list of his plants and published as a result the first complete catalogue, 1596, of all the plants grown in a single garden.

Christoph Johann Trew — illustration from *Plantae Selectae.*

Another Englishman whose garden at Long Acre brightened London at this period was John Parkinson, another apothecary, who became herbalist to Charles I. His two books, *The Garden of Pleasant Flowers,* 1629, and *The Theatre of Plants,* 1640, were both possessed by Dr. Fothergill. His first book had when first published a Latin title, which made a pun on his name. *Paradisi in Sole Paradisus Terrestris* might have a free translation as The Earthly Paradise of [the] Park in [the] Sun. The book is valuable because it really gives an idea of how a fine English garden was organized in the seventeenth century. In the pleasant Parkinson garden there were "all sortes of pleasant flowers which our English ayre will permit to be noursed up, with a kitchen garden full of all manner of herbes, roots and fruits, for meat or saus as used by us; and an orchard of all sortes of fruit-bearing trees and shrubbes fit for our land . . ." Parkinson's second book, *Theatrum Botanicum,* to use the Latin title, he justly called "an herball of large extent," for it included thirty-eight hundred species, many of which he described from his own observations. It included notes from L'Obel and made references to the work of Bauhin and in its turn was considered superior to Johnson's work in revising Gerard.

Clearheaded Gaspard Bauhin, whose edition of Mattioli's commentaries has already been mentioned, had conceived and carried to completion the plan of publishing in a single volume all that was known at the time about botanical classification of plants. Bauhin was well fitted for the task through his own studies and by his wide acquaintance with the chief contemporary European botanists. In his own herbarium, still preserved today at the University of Basle, he had assembled four thousand species. Dr. Fothergill owned a copy

of Bauhin's great works, *Pinax Theatri Botanici,* 1623, charting six thousand species. It was a tremendous accomplishment which succeeded in straightening out the confusion that had existed because different botanical authors used differing names for the same plants. Bauhin made a concordance of all the names and presented a unified nomenclature. This terminology was long standard. His work was especially useful to Morison and Ray in England, and a copy owned by Linnaeus in the eighteenth century contains annotations made by the great Swedish botanist himself.

Title page of Vol. II
Selectarum Stirpium Americanarum Historia
by Nicholaus Joseph Von Jacquin.

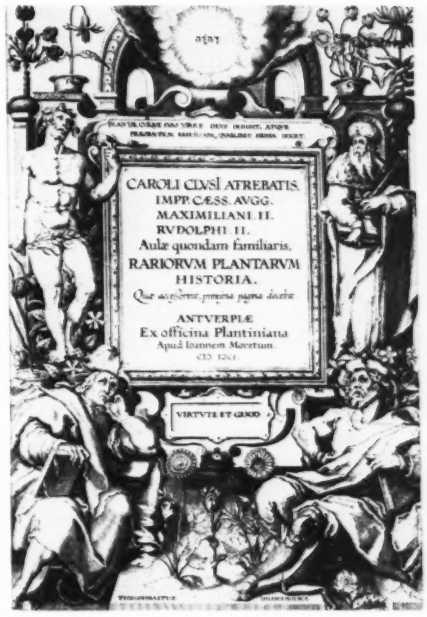
Several books in the earnest Quaker doctor's collection are remarkable chiefly for their beautiful plates. As woodblocks were succeeded by copper plates, illustration had made great strides. The *Hortus Eystettensis,* 1613, is outstanding, portraying by seasons without botanical details the flowers that grew in Eichstätt in Bavaria in the gardens surrounding the palace of Bishop Konrad on the Wilibaldsburg, forty miles from Nuremberg. Basil Besler was at work sixteen years, intermittently, on these drawings with the help of at least six engravers. In the two huge volumes which Dr. Fothergill had, there are over three hundred plates representing six hundred and sixty-seven species. Unfortunately, Bishop Konrad died while the work was going on, and never saw the finished volumes. His successor, alas, did not care for flowers so the garden was neglected and when, during the Thirty Years War, invading Swedish troops captured the Wilibaldsburg, a practically useful vegetable garden was established where once the famous flowers had charmed with their beauty and fragrance.

Dr. Fothergill's *Florilegium* issued by Emanuel Sweerts in 1615 reminds one somewhat of an elaborate colored catalogue prepared for a flower show. Sweerts was a Dutch florist who had once been employed by the Emperor Rudolph II as Praefectus of his garden. Charming flowers, like those pictured in this book produced in Frankfort-am-Main in 1615, could actually be purchased at Sweert's shop opposite the Römer during the Frankfurt Fair, so the author informed his readers.

Though the *Florilegium* considered as a type of botanical publication was prepared primarily for the use of the horticulturist or to stimulate the amateur grower of plants, and certainly has an aesthetic value as well, it is not always easy to differentiate between scientific and non-scientific worth in such illustrated volumes. A successful Nüremberg physician, Christoph Johann Trew, a man of wealth and taste, was responsible for the production of some of the finest illustrated books of lasting value which Dr. Fothergill possessed. Trew became the patron of George Dionys Ehret, the son of humble market gardeners in Heidelberg, who displayed his marvelous gifts in the hand-colored engravings which appear in Trew's *Plantae Selectae* 1750-1773. Scientific accuracy in delineating the plants blends with the beauty of their representation. In another work, *Plantae Rariores,* likewise sponsored by Trew and illustrated by Ehret, a number of engravings were included simply because of their botanical interest. The most elaborate of all the works with which Trew was connected is the set called *Hortus Amoenissimum Florum.* Twelve artists, including Ehret, contributed illustrations chosen for beauty of form from subjects they had observed in many different gardens. It is an elaborate record of the favorite flowers of the period—"a complete collection of the most magnificent tulips, narcissi and jonquils, the most charming roses, carnations and snowflakes, and the loveliest lilies, fritillaries, ranunculuses, aenemones and auriculas." No wonder these volumes were thirty-six years in the making, 1750-1786.

Several volumes of the *Hortus Romanus* of Giorgio Bonelli came to Dr. Fothergill's shelves as they were produced. These books portray in a florid style arresting to the eye the herbs grown for centuries in Rome's botanical garden for the instruction of medical students. Bonelli, director of the garden, selected for his ambitious undertaking plants of medicinal and economic value long cultivated for utility. This set begun in 1772 was not completed until 1793, thirteen years after Dr. Fothergill's death.

Some of the most interesting and elaborate eighteenth century botanical works are the folios of Nicholaus Joseph Von Jacquin, a Hollander who studied medicine in Vienna where he became director of Maria Theresa's gardens in Schönbrunn. From 1755-59 he traveled extensively in the West Indies to procure specimens for the royal gardens which became famous under his direction. He had planned and had erected for the display of his notable collections huge glass-enclosed conservatories, where among palm trees, thickets of bamboo and sugar cane, tropical birds flew about as in their native jungles. Two hundred plates illustrated the book recording his West Indian travels, *Selec-*



Title page of
Rariorum Plantarum Historia
by Charles De L'Ecluse.

tarum Stirpium Americanarum Historia, 1763. When in 1768 he became professor of botany and chemistry at the University of Vienna and director of its botanical garden, he was devoting himself to native Austrian plants in the preparation of five volumes called *Florae Austriacae,* published in a series 1773-1778. At the same time he had been working on three folio volumes of his *Hortus botanicus Vindobenensis* which was finished in 1776. Dr. Fothergill had these three works. Jacquin lived on into the nineteenth century, publishing what was perhaps his greatest work, an account of the Schönbrunn collections in 1804, which brought him the title of Baron.

In looking at any collection of books the eye will light on some with particular interest. Let us select five which excite special curiosity — one from Malabar, two which are the work of a woman who went to Surinam to study insects, one written by a Pennsylvanian, one about natural history in our own Carolinas.

The bulky folios of the *Hortus Indicus Malabaricus* are the work of Hendrik Van Rheede tot Draakestein, the Dutch Governor of Malabar who made extensive travels in his domain to collect strange exotic plants, employing Father Mathieu, a Discalced Carmelite monk originally from Naples, to help draw and engrave the plates. It is an impressive work, the illustrations boldly delineated with great economy of line, clear-cut, decorative but austere, coldly brilliant. Dr. Fothergill's set, twelve volumes in 6, was published in Amsterdam in 1678.

Very different in character are the warmly glowing, exquisite plates prepared with great attention to detail by Maria Sibylla Merian, famous for her depiction of the European and South American insects and butterflies, in life-like colors as she observed them in various stages among the leaves and flowers where they were feeding. Her interest was largely entomological through her studies, but since her work derives from the great Dutch flower painters by whom she was trained in art and one of whom she married, her books have dual importance. Her life, full of strange romance, took her to Surinam for two years. Dr. Fothergill possessed Merian's *De Generatione . . . Insectorum,* 1726, and her *Recueil des Plantes,* 1770.

The next book to consider is a small one, originally written in Latin by an American and published in Holland. Its text is by James Logan to whose family, always one of the most important in Philadelphia, he was to bring fresh distinction later by becoming Chief Justice of Pennsylvania. Some ingenious experiments he made on the problem of fertilization in corn had been first communicated in 1737 to Peter Collinson, F.R.S., of London. This work was given brief publication in the Philosophical Transactions of the Royal Society. Afterwards, Logan expanded this report into a small book for use by European botanists, writing it in Latin because English was not known to many of them. Dr. Fothergill took occasion to make the work easily available to his own countrymen by putting it into English in 1747.

The last book is Mark Catesby's *The Natural History of Carolina, Florida, and the Bahama Islands,* a classic in the United States which needs no introduction. Catesby, born in Ireland, had first visited the southern states because he had a brother who was secretary of state in Virginia. This first visit to America lasted seven years. After his return to England, his glowing reports led Sir Hans Sloane and other naturalists to urge him to go back to America to make a complete study of natural history in the southern colonies. With this purpose he came for a second stay of four or five years, traveled through Florida and the Bahamas, learned how to make etchings, and so was able to draw and engrave illustrations for his text which students of early American botany and zoology still find useful. Ehret was Catesby's friend and made two drawings for this book. Dr. Fothergill

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Auricula from *Hortus Romanus* by Giorgio Bonelli.

Gentiana alpina pumila brevifolia from *Hortus Romanus.*

Rufcus myrtifolius aculeatus from *Hortus Romanus.*

PLANT COLLECTING
IN RELATION TO MODERN AMERICAN TAXONOMY

Plant collecting builds up a reservoir of material, enabling taxonomists to provide an "Open Sesame" to the identity and relationships of plants.

By **Arthur Cronquist and John J. Wurdack**

TO THE LAYMAN, a herbarium usually seems to be a cloistered static place, with little of the visible appurtenances attached to science. Perhaps a better appreciation could be gained by an analogy to a library, many of whose books lie unread for long periods, but whose classification and attendants enable immediate consultation on wide-ranging subjects. The New York Botanical Garden herbarium and taxonomists provide an "Open Sesame" to the kinds of plants in all parts of the world. While we cannot immediately answer all answerable questions, we can give information as to where any taxonomic question could possibly be answered. Behind such a front of public knowledge lies both a past and a current activity in the collection of scientific specimens and their classification.

In the past fifty years, the importance of plants as sources of food and construction materials has not diminished. As medicinal sources, their importance is in at least temporary eclipse, as can be seen by consulting old and current pharmacopeias. (Of course, notable and well-publicized exceptions exist to this generalization — cortisone, reserpine, and antibiotics.) Chemosynthesis has replaced and will continue to replace many natural plant sources of drugs and other commodities. However, plants and their natural products have provided the starting points for such laboratory successes. Perhaps these many triumphs of chemists have caused neglect of investigation into other possible uses of plants currently commercially unexploited. Just the vast number of different kinds of plants surely insures, at least statistically, the chances of such unknown uses. Today's "ivory-towers" (inherent in plant taxonomy as well as in all other science) may well tomorrow suddenly be very relevant.

At present there exist throughout the world many hundreds of herbaria devoted to a local flora. The large general herbaria are very few and some of these are semi-quiescent. These large museums (those with over one million specimens) serve as repositories for botanically historical collections, as a record of the original vegetation of now-populous areas, and for general "crude" identification of the world's plant life. Such herbaria are also the only readily accessible source of information concerning the plants of "underdeveloped" (little-known) regions.

For such purposes, it might seem that The New York Botanical Garden could lean upon the present accumulation of almost three million specimens and remain a static place acquisitionwise. Our continuing field activity to add to the preserved specimens is carried on because (1) we have represented at present perhaps only half of the different kinds of plants, and (2) most of the species of which we already have specimens are inadequately known as to variability, geographical distribution, or ethnobotany. Collecting trips serve to remedy these inadequacies, as well as to give the staff a field knowledge of plants. Of course, the experiences (botanical and otherwise) of such trips serve as a reservoir of non-botanical general information and "tall stories" (or their refutation) as well.

One generality applies to the collecting of scientific specimens of all groups of plants. The collected specimen, with field notes, should be as complete as possible, giving information on habit and technical identification features such as flowers and/or fruit. Each group of plants has its own "specimen" idiosyncrasies. Some species can be dried while others require "pickling" of fresh material to retain necessary features. Many aquatic plants must be carefully floated out on sheets of paper before drying in order not to obscure such delicate parts as finely divided submerged leaves. Bulky fruits are dried apart from the thin vegetative parts. Fungi usually will not withstand the pressure of a flowering plant press, so must be dried separately.

The destructiveness of modern warfare, as well as the delays and inconveniences of borrowing specimens from politically or geographically isolated herbaria, makes the collection of large series of duplicates of each collection number advisable. Our duplicates are shipped to other large herbaria in all parts of the world in a "postage-stamp" sort of swapping. We in return receive specimens collected in areas not currently being visited by our staff.

TROPICAL AMERICAN COLLECTING

Plant collecting in the American tropics offers little in the way of Hollywoodian equatorial glamour; only after the memories of many delays, wettings, and insect bites have become faint do such pleasant recollections as the quiet moments at day's end and the fascinating plants make another trip seem desirable. Physically, tropical exploration, properly planned and conducted, is no more arduous than a trip on the Appalachian Trail. The mental hazards seem much greater.

Preparations for a trip to an area such as Venezuela begin during a preceding expedition with the making of lists of non-expendable equipment replacements and the storage in warehouses in South America of such gear as tarpaulins and plant presses. In New York, purchases are started several months before the next departure. The Garden taxonomists are connoisseurs on the Government Surplus stores in the New York area; we have ferreted out the lowest-price quality sources for such miscellany as machetes, tarpaulins, and beads. No piece of equipment — even such essential trivia as needles, thread, twine, and cigarette lighter flints—can be forgotten. Indeed, except for necessary allowances for customs barriers, it seems best to leave the United States with all possible supplies purchased, packed, and arranged in some sort of logistical sequence, rather than to trust to local sources upon arrival in the tropics.

For our Venezuelan work, we have

At rapids in the Rio Cunucunuma, equipment had to be portaged.

fortunately found several reliable natives, so that some of the burden of local arrangements has been lightened. Also our *norteamericano* friends within Venezuela generously assume and ease many of the inconveniences of cutting "red tape." Food supplies, including such native staples as *casabe*, rice, dried beans, and blocks of brown sugar, are all purchased from local Venezuelan sources. Ciudad Bolívar, a town of about thirty thousand people on the south bank of the lower Orinoco River, serves as a purchasing and organizational center for us. There we attend to semi-final equipment rearrangement and weighing, getting currency of all denominations for labor payment and day-to-day fresh food purchases, and commercial transportation arrangements. Most of our trips have departed in two directions from Ciudad Bolívar: by air to the Gran Sabana or by river packet to Puerto Ayacucho on the upper Orinoco. All dry cargo goes with us personally; gasoline and oil for outboard motors and drying stoves must be consigned for Puerto Ayacucho by separate boat.

At Puerto Ayacucho or a local airfield in the Gran Sabana, there is a final arrangement of cargo into units suitable for carrying or for dugout transportation. Here also comes a crucial point in the life of every expedition —the beginning of hiring of laborers. This process is a callous one, analogous to the hiring of pack burros, omitting only the actual counting of teeth and pinching of muscles. While generally undersized (by South American standards) men are not suitable for extended pack trips, it is equally true that relatively huge muscular men seem to be unreliable and lazy (or perhaps more discreetly, too busy hunting or otherwise enjoying their status quo).

Much has been made — in movies, books, and magazines — of the heroic values attached to the struggles of the white man against the jungle. Rarely is the efficient (albeit by our standards, lowscale) existence of the South American mestizo or Indian woodsman, trained by over four hundred years of experience, realistically and appreciatively portrayed. It is always best and most efficient to let the natives decide the daily details of life in the bush and to let them handle the glamour of machete work, firebuilding, and camp erection. Only three items require constant supervision: rationing of food, trail cutting, and order of cargo transportation. Invariably, unless one is actually daily with the trailcutters, the paths take an inordinate amount of time to open. As for the usual camp details, after the first few days routine is automatic, although the first night's camp is often a confusing experience. "Green" (*norteamericano*-wise) natives, used to their own inconsiderable weights and frail overnight setups, do not allow sufficiently for the bulk of the *botanicos;* the tarpaulin frame is then strengthened in the dark after the combined taxonomic poundage has brought all hammock bottoms dragging on the ground. Subsequent frames are automatically adequately designed.

Usually the approach and route of ascent of a "lost-world" mountain has been roughly plotted on a previous trip. The final water approach to a typical mountain is in dugouts along a log-choked, often rapids-filled stream. At the head of navigation, a permanent storage camp is constructed. Subsequent trails and campsites are determined by carrier-load ease and distances. The lowland and lower slope forest trails require minimal cutting and are comparable to traversing a beech-maple forest; the lush lowland jungle growth of Hollywood occurs only around windfalls or man-made clearings. As paths penetrate the talus forest, the terrain becomes rockier and logs must be placed across gullies and ropes or ladders on the steeper slopes. Scrub forest, *Clusia* at first and *Bonnetia* just below and on the summit, slows progress at higher elevations. In this moist forest, three to four days' cutting with axes and machetes is necessary for a carrier-load day. The carriers have a sixth sense for avoiding the stump snags remaining after a trail is opened; white men's shins, however, suffer greatly. On steeper slopes where handholds are helpful, the nearest support is invariably a spine-armed palm or tree-fern trunk. From base camp to mountain top involves up to six intermediate camps, each about a half-day's unloaded walk apart.

All food and equipment must be in units of forty to sixty pounds, to be carried on back-pack frames; these frames are woven by the carriers from palm leaves and petioles and tied with flexible vines. The pack units are severely restricted in volume as well as weight, since projecting loads will catch in uncut vines or aerial roots along the trail. One nagging problem is the order of arrival of equipment and food upwards. Since there is essentially no game available above about one thousand meters elevation, several kinds of canned meat must be packed to the *cumbre* (summit); the first week or so of *cumbre* work is usually characterized by a diet of rice with all "Spam" or all "Treet" or all corned beef. Somehow at least one of the first loads to

arrive in the *cumbre* consists of some item not needed until the trip's end.

The cargo carrier-food ratio has always been such that only one permanent summit camp could be maintained. The establishment of this camp is preceded by at least one trip to pick the best available site—a relatively flat one with the best drainage, a nearby water and bathing source, a local source of poles for tarpaulin frames, and where sunlight can be used to dry out equipment. The mountain tops are mostly covered with a deep peat layer, with rather erratic rock outcrops, so that campsites often must be corduroyed; rarely does one find a flat sandy area. The most comfortable living is in a tent; a cushion of leaf-covered *Bonnetia* branchlet tips covered by palm leaves and a ground cloth makes a very adequate air mattress substitute. A suitable latrine and tarps for the carriers, cook area, and specimen-preparation table complete camp essentials; gradually refinements such as benches around the campfire, camp vicinity trails, and bathing pools are added.

From the permanent camp one-day walks are taken, and later, two-to-four-day collecting trips with fly camps. In the cool uplands, most plants will keep quite fresh for several days after collection, if wrapped in bromeliad *(Brocchinia)* leaves and stored in canvas sacks. All specimen preparation and drying are done in the permanent camp; we have felt that use of a field press or such preservatives as alcohol and formalin yielded inferior specimens. In the hot lowlands, cut branches do not keep well, so one day seems to be a practical limit for storage prior to pressing. For lowland riverine collecting, a temporary press (with reinforcing blotters as well as newsprint) can be used for immediate preparation of specimens in the dugout. All herbarium specimens of flowering plants are dried on a wooden frame, using aluminum corrugates between a specimen sheet-and-blotter unit, by heat from a Coleman gasoline or kerosene pressure stove. Dried specimens are bundled with moth flakes, using double-face cardboard corrugates for support, then sealed in heavy wrapping paper and stored in convenient wooden or fiber boxes (or less desirably, canvas bags).

Personal accommodations on trips follow, with some refinements, native practices. In the lowlands and up to about one thousand meters elevation, native hammocks with light blankets are slung for sleeping. In the upper talus forest, hammocks with sleeping bags are used, and in the *cumbre,* sleeping bags in tents. Temperatures sometimes fall below 50° F. and with 100% humidity, the air is very cold. GI fatigues or suntans with tennis shoes and socks tucked in are ideal for clothing; in the very moist and slippery *cumbre,* low boots are sometimes preferred. Beards are not shaved for the duration of the stay in the bush, for convenience and, more importantly, for protection against the innumerable black flies of the upper Orinoco lowlands. Bathing is a daily routine, but the duration is briefer with increasing altitude, with the *cumbre* water usually at about 60° F.

Departing a tropical camp involves only being sure that no gear is left behind. Arrival back at the jumping-off point, paying off the men, the first American food, the boat ride back to New York — all are minor highlights. Then follows the most enjoyable part of the expedition, the unpacking of specimens and sorting into families prior to taxonomic study.

It might seem that the actual collecting of plant specimens has been neglected in the preceding paragraphs; the emphasis however has been correct — that the purely taxonomic phase of tropical field work is a minor problem. The prime qualification for such trips is the ability to organize men and equipment. Any physically reasonably well-conditioned man who has this organizational ability can quickly be trained to collect and prepare specimens. Of course, a collector with little formal botanical training will not produce much in the way of botanical rarities if collecting in Europe or temperate North America or along the highways and tourist routes in South America. In the more remote areas, no one can make a mistake as far as the availability of desirable species is concerned. Indeed formal botanical training might conceivably be a handicap if this taxonomic knowledge permits the overwhelming of specimen quality judgment and logistical conduct of the expedition by the strangeness of the plants.

There is one prominent neglected phase of collecting in the American tropics. Horticultural collectors of the past have concentrated their efforts in the Andes and a few small areas in the coastal South American lowlands. Only a relatively few of the upland (including the Guiana Highlands) plants have been successful on a large scale horticulturally; a few species of *Begonia, Calceolaria,* and *Fuchsia* are notable examples. The untried majority are certainly climatically not adapted to our hot northeastern U.S. summer nor to the subtropical areas of the world.

(Continued on page 159)

Vast sand-bars *(playas),* such as this one near Cerro Baraguan, impede navigation on the Orinoco during the dry season. These *playas* provide turtle eggs for natives and botanists.

NOTES ON:

The Perennial Border

By **Fanny Wickes Parsons**

PLANTING the perennial border is like painting a picture, in that you must use both color and form. So often the standard plans for such plantings show oval forms of various sizes, labelled with the names of a good choice of flowers, and careful as to season of bloom and color.

This simply does not work if followed too closely. Try making a pattern of ovals, all more or less parallel, on a sheet of paper. You will find it somewhat lacking in interest. Of course, plants vary enormously in texture and mass, and this will help you greatly. But you will find that the spaces between the ovals are hard to deal with, will be unsuitable for almost anything except bulbs, and will occur far too regularly.

Let me suggest some effective forms. There is the round plant, peony, gypsophila, baptisia, which is best planted as accent, a single plant at a time. There is the crescent. This is particularly pleasing at or near the front of the border and consists of a half-circle of any neat, upright plant — nepeta, heuchera, the smaller funkias — the roundness facing the spectator. Within this semi-necklace taller plants can be placed — platycodon, peony, fraxinella —ones whose lower stems are not their best point. These crescents should be occasional, not too regular, and perhaps four feet or so in diameter.

The diagonal is a happy choice. Start a line of plants in single file about two feet from your edge and run them back at an angle of, say, 30° for six feet or more. Again, fairly neat plants, this time of medium height, are best—foxglove 'Isabellina,' Chinese delphinium, pyrethrum, phlox 'Miss Lingaard.' (I am assuming you have a border at least nine feet deep.) This diagonal idea can also be carried out in a V formation, using the same plant for both sides. Then the V can be filled in with possibly an accent plant in the point, and two tallish groups beyond. A clump of plants with the narrow side facing the edge—the oval at right angles, so to speak—is a nice change. Remember that a border is looked at by those walking past, as well as head on, and plan to take the eye on surprise vistas.

The very edge of the border is always a problem. Here at The New York Botanical Garden we have a nine-inch concrete coping, a needed protection against trespassers. While not very lovely in itself, it has become a blessing. Trailing plants have consented to grow and form neat mats, hanging over the edge and thereby creating yet another pleasing shape.

All borders cannot be raised in this way. However, a definite edging is recommended, either brick laid on side, or flat-cut, foot-wide stones placed continuously, or even rough field stones, provided the bed can be filled in back of them. These last look deplorably like angry teeth for a while, but small plants—violets, nepeta, dianthus, primulas, pansies—(there are many others) cover them beautifully in a year or two. The one thing that is not recommended is the usual grass. If only grass edges your border, do not trim the turf with an edging tool and gouge out a steep cut. Keep the soil at least level, or a little above the grass, and use very neat, persistent plants, such as iberis and nepeta, to keep it in its place. Even so, you may have to clip the grass to prevent its stealing into the border. This is not to stay that grass, either as path or lawn, is not a lovely foil — merely that something should interpose, between grass and loam. The flat-cut stones, while the most expensive, are the most beautiful, and allow the wheel of mower to run conveniently when the grass is trimmed.

Iberis is, I think, the perfect edging plant: neat, healthy, glossy, persistent foliage and dazzling white rosettes of flowers in May. It is happy on flat ground where it makes billowing clumps about six inches high, or it will foam white and green over an edge and down, not far down, but enough. It should be clipped back after blooming. Double *Arabis alpinus* is another trailing edging with gray-green foliage, somewhat less neat later, though its flowers, little creamy white April-May spires, are enchanting. The single arabis gives nowhere near the same effect. The well-known *Alyssum saxatile* is a generous trailer and a needed color contrast. *Dianthus plumarius* is a charming edging plant. Its thick, blue-gray mat of foliage can be kept to any desired size. The flowers are a multitude of small single carnations, white, pink or lightly striped. It is intensely fragrant. Along with *Primula polyantha* for shady places, small-leaved ivy for deep shade, and multi-colored pansies—yellow and brown pansies grouped about *Alyssum saxatile,* forget-me-not with double arabis, deep blue or reddish pansies with iberis the spring edging, two hundred and forty feet of it at the perennial border here, is very gay.

Solidago 'Goldenmosa'

As these delights fade, *Campanula carpatica,* in blue and white, *Cerastium tomentosum* (snow-in-summer) and *Nepeta mussini* take their place. Nepeta (cat-nip) is really indispensable. Cut back, it will bloom a second time, and its distinctly gray-green foliage is a wonderful binder. It is most tolerant of the hot sun.

On a visit to Wisley, the gardens of the Royal Horticultural Society in Kent, I noticed particularly the part played by gray foliage in the general perennial picture. As a binder of sharp colors it has no equal. Scarlet and magenta can be fairly close if only gray, and perhaps a little white, intervene. So far I have mentioned arabis, nepeta and alyssum as having gray foliage. That is useful, but not nearly enough.

Among many others are santolina, lavender, artemisia, gypsophila, echinops and certain iris leaves, though these last are seldom dependable after bloom.

One other trailing plant must be mentioned: plumbago. (It has the jaw-cracking name of *Ceratostigma plumbaginoides.*) Developing late, in July it produces shiny, thick, neat leaves and deep sky-blue flowers.

Early in spring, and into May, *Dicentra spectabile,* bleeding-heart, is very effective in the deep corners of the border, the shady bays among the background shrubbery, now very tall and thick. It does as well, or better, in full sun. However, dicentra dies down and becomes shabby and finally disappears by June. It is best to place it where it can be hidden eventually, and to underplant it; epimedium, with its neat, persistent leaves and later, yellowish flowers, fills the gap very well.

A most attractive device is to plant two flowers of the same color but of different size next to each other. White perennial gypsophila with shasta daisy nearby or white Chinese delphinium, or phlox 'Miss Lingaard' or white Japanese iris is a delight. The same trick can be worked with tall delphinium and *Delphinium Belladonna* or blue cynoglossum planted about it. Yellow *Thalictrum glaucum* with late yellow daylilies is effective.

It is nearly impossible to have a perennial border in any kind of condition without using some biennials and annuals. For one thing, most of these have no counterpart among perennials. Such are *Campanula media,* the single Canterbury bells, which I prefer to *Campanula calycanthema,* the cup-and-saucer kind. A second bloom can be had on these if the first flowers are cut off just below the calyx, but this is very tedious. Digitalis (foxglove) is another unique biennial. In addition, delphinium really has to be treated as, at best, a biennial and so does aquilegia (columbine) to some extent. When the Canterbury bells are over, chrysanthemums are a convenient substitute: the same height, the same substance of plant.

Annuals are a bit more of a problem. To grow well, they should be planted in May, or rather interplanted with other things. If there is no room for them, well-grown potted plants must be put in toward the middle of June. One of the best is heliotrope, actually a tender perennial, delicious when planted near nepeta. Lobelia, pale and deep blue mixed and white, are very attractive to take the place of pansies. So is verbena. Petunias are useful, but often sprawling and untidy in their habits. Pale yellow and soft pink zinnias (colors planted separately) and white and red nicotiana, well apart, are good in the medium heights. Planted late, if must be, these are all heat tolerant.

The spring and early summer garden, with its columbine, iris, peony, delphinium, baptisia, thalictrum dependables, among others, is far easier to manage than the July-August picture. There is usually a serious slump, all of a sudden, toward the end of June. A little planning can mitigate this slump a great deal. Aside from *Phlox paniculata,* which does poorly here at the Botanical Garden but is very dependable and somewhat over-used in most borders, platycodon in blue and white, *Veronica spicata,* a lovely soft blue, achillea, a pearly white, red and pink monarda, white physostegia, *Salvia azurea, Echinops ritro* and *Aconitum*

Lilium Sargentiae hybrids.

autumnale are helpful. Coreopsis, late-blooming hemerocallis, lilies, and lemon hollyhocks could supply a yellow note. The hollyhocks, of course, must be treated as annuals. They take up a lot of room, but only a few are needed.

Some unusual plants might be interesting to mention. Dictamnus (gas-plant) is ordinarily seen in its purplish pink form. The white form is smaller in all respects, but alike, and also May blooming. It is exceedingly slow to develop—three years at least; its charm excuses the long wait. *Cynoglossum nervosum* is a bushy plant, about two to three feet high, with clear, almost strident blue flowers, small but thickly borne, and blooming in June. Potentilla (the argyrophilla varieties), resembling a strawberry in leaf, grow to a bushy one and a half foot with bright yellow or bronzy yellow or cream and reddish single flowers in June. Solidago (goldenrod to you and me!) has long been an English border favorite. Tall, pale yellow, it only faintly resembles the wild weed of our pastures.

The last three-mentioned plants are among those that T. H. Everett brought back from his plant-hunting trip to England in 1954.

Another charming thing is a geranium, a cranesbill, the leaves about one foot high, and the flower stalks about that much higher, bearing bright purple flowers, veined red. This is probably *Geranium ibericum platypetalum.*

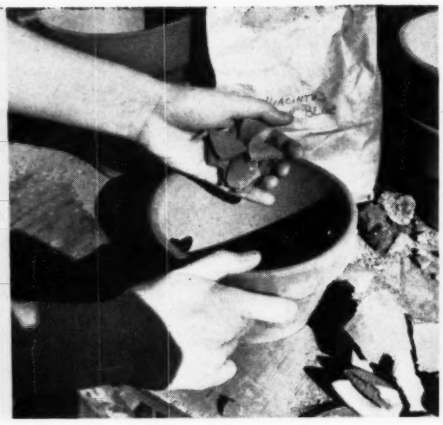
It is unwise, I think, to plant narcissi, at least in any quantity, in a perennial border. The brown remains, which must be tolerated, are too sad. If there is a shrubbery background, clumps at the outskirts of the shrubs are delightful in early spring when the border has no height, and are well hidden later on.

Tulips can be planted in a border in many ways. One that we have liked is to use mixed groups of cherry-pink, pale pink, deep violet, mauve and moonlight-yellow, mixed, a dozen to a group. These are for the most part underplanted with *Phlox divaricata,* a flower, I must say, that seems to wander and run out from year to year. 'Clara Butt', an old favorite pink tulip, is planted in groups near the bleeding-heart.

A great feature has been made of lilies. These have included the sturdy regals, Green Mts. hybrids, *Lilium Sargentiae, L. princeps, L. centifolium, L. candidum, L. pardalinum giganteum, L. elegans* var. Dropmore, a cup-shaped peach-colored lily, *L. longiflorum,* 'Mountaineer' and 'Shuksan'. In addition, we have *L. tenuifolium,* a delicious deep shrimp color. They are all very tall, except the last two, and, of course, somewhat leggy. Tall, bushy, perennials should stand in front of them, for flower, if possible, for foliage

(Continued on page 156)

1. Drain pot by first placing in position large crock, hollow side down, over hole.



2. Then add smaller pieces of crock, gravel or coarse cinders to a depth of one inch.

3. A layer of hay, straw or leaves is placed to prevent the soil washing down.

HOW TO FORCE DUTCH BULBS

By T. H. Everett

FORCING BULBS to provide blooms indoors in winter and spring is a delightful phase of gardening. Its techniques are simple, its results sure if a few easy-to-learn rules are followed. Dismal failure, however, can result from violating basic principles.

The so-called Dutch bulbs (many are propagated and raised in America, but the name Dutch bulbs sticks because in Holland their production is a major industry) are much the easiest kinds to force. Here belong hyacinths, narcissuses, and tulips—the big three—and such minor bulbs as crocuses, grape-hyacinths, glory-of-the-snows, scillas, and snowdrops. Easiest to force are hyacinths and narcissuses, with early varieties of tulips, both single and double-flowered, close seconds. May-flowering tulips are less well adapted for growing in homes but may be brought to splendid bloom early in greenhouses. The minor bulbs force well provided they are not subjected to too-high temperatures. In a sun room where the thermometer does not register above 50° or 55° at night and five or ten degrees higher by day, they may be grown successfully.

The rules for forcing Dutch bulbs are these:—

1. Plant only first quality, top-size bulbs.

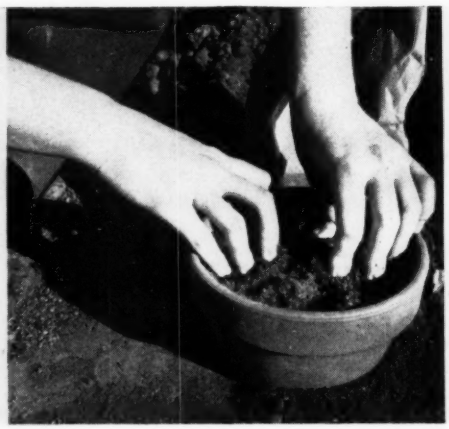
2. Plant early, in September if you can obtain the bulbs by then, certainly not later than October (with the exception that for late blooms Paper-White, Grand Soleil d'Or and Chinese Sacred Lily narcissuses are planted in November and December).

3. After planting keep the bulbs in a comparatively cool place until an ample growth of healthy roots has developed, then, and only then, introduce them to forcing temperatures.

4. Never let the soil or other rooting medium become dry.

5. Expose all bulbs to full sunlight after their shoots are two inches tall, except hyacinths which may be kept in the dark until they are five or six inches high in order to induce the flower spikes to lengthen.

4. Porous soil of moderate fertility is added but not packed firm before bulbs are planted.



5. Bulbs are set so tips will just show above soil surface. The soil is then pressed firmly.

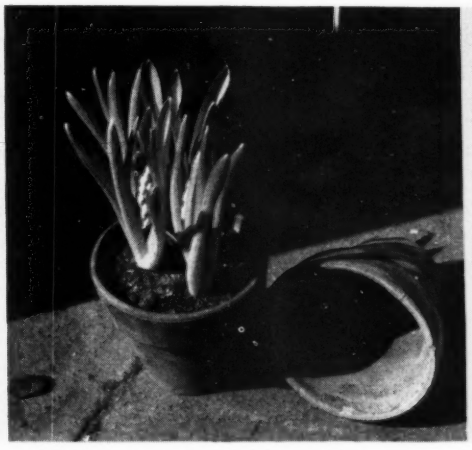
6. Planted pot shows space left for watering; bulbs planted close together, not touching.

7. Soak newly planted bulbs with a fine spray, placing them in a cool place to root.

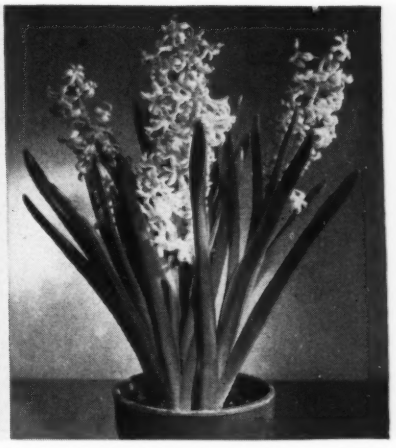
8. A good method of encouraging rooting; bury pots outdoors under cinders or sand.

9. When bulbs have filled pots with roots and shoots are 1-3 in. tall forcing may begin.

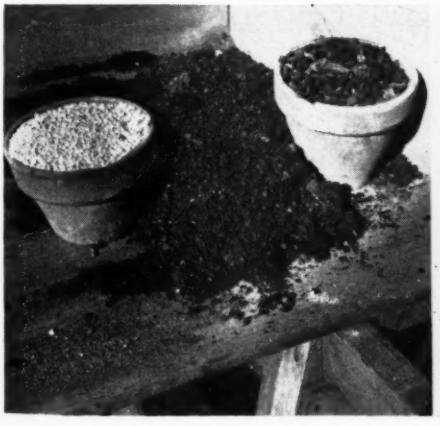
10. To encourage tall flower stems shade hyacinths with flower pots or other means.



11. Remove shade when flower spikes are well advanced and accustom to light gradually.

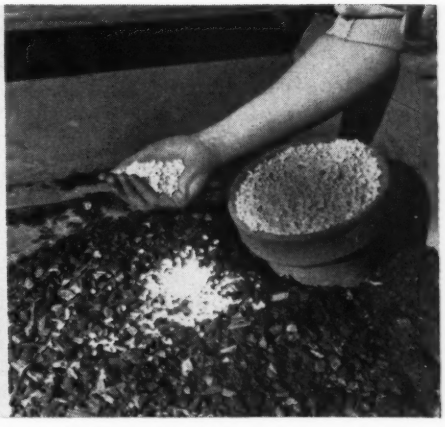


12. When in bloom keep flowering bulbs in cool room, out of sunshine.



13. Ingredients for making bulb fiber: peat moss, charcoal and pearlite or limestone.

14. The charcoal, which is chopped to peanut size, is added to the moist peat moss.



15. Then pearlite or limestone chips are added. These counteract the excess acidity.

16. Next, the ingredients are mixed together thoroughly while in a just moist condition.

17. Ready prepared planter mixes may be substituted for bulb fiber prepared at home.

18. Here, crocuses are being planted in bulb fiber, pressed firm beneath and above bulbs.

Dutch bulbs may be planted in flower pots or other receptacles with holes in their bottoms or in containers, such as bowls, without provision for drainage. In the latter case soil must not be used as a rooting medium because, under such conditions, it turns sour and causes the roots to rot. Plant bulbs in undrained containers in special bulb fiber, a planter mix especially prepared for bulbs, or in vermiculite, sand, or other moisture-holding medium that does not contain leafmold, humus, or other organic matter that will rot quickly. Bulb fiber may be made by mixing some peanut-size charcoal and some pearlite (sponge rock), limestone chippings, or crushed oyster shells with slightly moist peatmoss.

Bulbs may also be forced in containers filled with pebbles and water, and hyacinths in water, to which a few pieces of charcoal have been added, in special hyacinth glasses cupped at their tops to hold the bulbs snugly.

When planting in flower pots or other drained containers, first cover the holes with an inch or two of crocks, cinders, or gravel. Over this place a layer of leaves, straw, hay, or moss so that the soil will not clog the drainage. Fill in sufficient soil so that when the bases of the bulbs rest on it, their tips will just protrude from the surface after the pot is filled with earth to within an inch or so of its rim (the space beneath the rim is left to facilitate watering). Press the soil beneath the bulbs only lightly but pack it down firmly at the surface; if the soil under bulbs is too firm, pressure of the growing roots is likely to lift them out of the soil. Make the surface level. Plant the bulbs quite closely together but not quite touching each other.

The soil need not be especially rich, but it should be moderately so and, most important of all, porous. A mixture of equal parts good topsoil, peatmoss and sand with a pint of bonemeal mixed with each bushel is adequate.

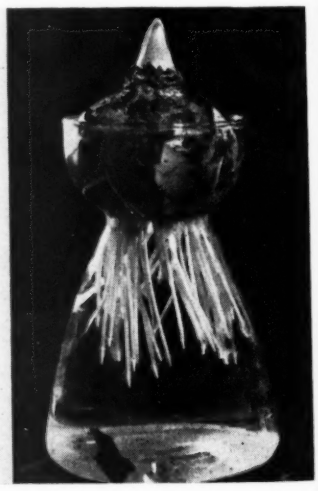
If bulb fiber or planter mix is used, pack it firm both under and over the bulbs. Don't pack vermiculite at all, merely pour some into the containers, set the bulbs in place, then add more vermiculite and settle it by watering with a fine spray. All newly planted bulbs should be well watered but not to the extent that undrained receptacles of bulb fiber or vermiculite hold pools of free-standing water in their bottoms.

After planting Paper White, Grand Soliel d'Or, and Chinese Sacred Lily narcissuses or Roman hyacinths (none of which survives severe freezing), put them in a dark cellar or similar place where the temperature remains approxi-

(continued on page 154)

19. Narcissi grow well if planted in undrained containers that are filled with gravel and water.

20. The planted bowls are kept in a cool, dark place until they are well-filled with healthy roots.



21. Special hyacinth glasses used to grow bulbs in water.

TREES—

OUR GLORIOUS HERITAGE

By **Harold Palmer Piser**

In the beginning God created the heaven and the earth. And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind, and God saw that it was good.
GENESIS 1:1,12.

DOWN THROUGH THE AGES trees have been the universal symbol of God's bounty of good and plenty in the material realm. Today we are rapidly losing this glorious heritage. Land is being cleared of trees and other plant life for vast new developments. The beautiful countryside is vanishing. Unless we "catch up" and put a stop to this thoughtless and wholesale destruction, all of this natural inheritance — our trees, God's beneficence to man — will disappear.

Whether in primeval stands of unspoiled beauty, in forests and orchards that yield products essential to man's existence, as beautifiers of our home grounds, city streets, and country roads, trees are our friends. As conservers of soil, water, and wildlife, as cool and restful shelters, affording places for recreation and nature study, trees need our understanding, our love, care, and protection. *God saw that they were good.* He meant for us to use them wisely, by seed to propagate and to foster their well-being. Thus would His good and plenty forever benefit mankind.

Many trees have been felled for fuel and to make room for the growing of crops. That was good—then trees were plentiful. Many trees have been cut for lumber, for the making of paper, and the innumerable other products derived from them. That, too, was good—when trees were plentiful. Many trees have been used to beautify our homes, our streets and roadsides, have given us cool, restful shade, stirred and satisfied our aesthetic senses.

But man, in his greed for opulence and power, has ignored the necessity of re-planting the "seed" so thoughtfully created by Divine Providence. He is more rapidly depleting the land than reforestation can keep pace with. He is making us a treeless people. Self-propagation and the planting of seedlings and reforestation generally cannot keep up with the tremendous demand for forest products. Tree nurseries are not only increasing in number, but in size. Almost endless rows of seedlings are not an uncommon sight. Federal, State, and private enterprises are working at full capacity in an effort to counter-balance supply and demand. It would not now be necessary to go elsewhere for some of the raw materials, had the "seed" been planted, as God provided.

Not satisfied with almost clearing out the forests and the woodlands, man is now sweeping our streets and countrysides clean of trees. In the cities, he is removing one after another of our shade and ornamental trees. Some day in the not too distant future none will be left, so fast is his destruction, except in parks, garden centers, botanical gardens, and arboretums, where men of wisdom and science are trying hard to retain and replace some measure of this natural beauty. Tree-shadeless streets and roads now meet the eye almost everywhere; the once attractive tree-lined main street of an urban community has been lost in the march of progress. Traffic conditions demanded more space for parking. Down with the trees!

Man is spreading into the suburban areas and throughout the countrysides. Construction of every sort goes on at frantic pace, in mass quantity and gigantean size. Except in rare instances, plans include no fair and reasonable provision for retainment and replacement of shade and ornamental trees; hence vast areas are cleared of all plant life and particularly of trees. With mighty machines the ground is bulldozed, excavated, leveled-off; nothing remains but subsoil, sand, and gravel.

Some means must be found to halt this new army of invaders and destroyers, the real estate developers, builders, and the contractors—mind you, not all of them, but the speculators and the "fly-by-night" builders whose only thought is to make a quick profit and then move on to the next site. Impressive and far-seeing are the plans and programs of the better class of builders; care of trees is a very definite part of their specifications. It is the selfish and unscrupulous ones at whom we point our finger. It is they, along with the thoughtless and careless contractors, who destroy trees, kill plant life, and scatter the topsoil; who scar trees or wound them deeply, who lay bare roots or pile soil high around tree trunks and upset water-tables. Trees so badly treated are doomed to slow starvation, to certain eventual death, and "conservation" is put to shame. Bulldozer, steamshovel, and grader, axe, saw, and pick are the armaments of this new kind of enemy. They must be stopped before *all* our trees are gone.

What has happened to the planners and the architects, these men of vision? Does natural beauty no longer have place and purpose in every sketch, plan, and blueprint? Have they forgotten that trees enhance the beauty of any property, be it private, commercial, or public; that values are increased, selling made easier, simply by retaining as many trees as possible? Trees should be of equal importance to line and measurement on blueprint, more than simply a "filler-in" on sketch. Trees should be a definite part of planning, long before blueprint is made, and the new property owner saved the expense of acquiring costly specimens to replace those needlessly destroyed in the building operations.

What of civil authorities, the ordinance and lawmakers? Have they forgotten their duty to community and citizens, as well as God's trust? They must be blind not to see what lies ahead, not to recognize that trees are the natural beautifiers of homes, streets, and roadways, of communities, towns, and cities; blind not to consider, too, the conservation factors involved, all so urgently important if a continuance of "peace and plenty" is to be maintained.

Everyone's interest must be enlisted in stopping the ruthless destruction of trees and in encouraging their protection.

FORCING DUTCH BULBS (from page 152)

mately between 35° and 45°. This treatment is also followed with *all* bulbs planted in undrained containers and is suitable, too, for drained ones.

But the latter can be handled in another way. They succeed well if buried outdoors under about six inches of sand or sifted coal ashes during their rooting period. After the top of the sand or cinder cover is frozen a few inches of leaves, straw or hay placed over it gives welcome additional protection.

The time taken to form sufficient roots to make forcing possible varies according to the kind of bulbs and some other conditions. From eight to ten weeks is perhaps average, but the narcissuses Paper White, Grand Soliel d'Or, and Chinese Sacred Lily, and Roman hyacinths need less time.

In any case, all bulbs plunged outdoors should be removed from under cover of sand or ashes by the time their shoots are two inches above the soil in their pots, and all bulbs other than hyacinths should be moved into good light by that time (shade them from direct sun for the first week following taking them from the dark).

Hyacinths benefit from being kept shaded with inverted flower pots, cones of paper, or other devices until their flower spikes are well up and their foliage is six inches or so tall. At that stage gradually accustom them to light, and finally to full sun.

For hyacinths, tulips, and narcissuses forcing temperatures of 60° to 70° are satisfactory; lower temperatures, as previously indicated, are necessary for the minor bulbs.

Once forcing begins, an ample supply of water for the roots is needed, but care should be taken not to flood undrained receptacles in which bulbs are planted in bulb fiber or vermiculite to the extent that they retain free-standing water in their bottoms.

Neat staking and tying may be needed. Bulbs in bloom will remain attractive longer, if they are kept in a 50° to 60° temperature than at higher levels.

Bulbs that have been forced are of no use for similar treatment the following year but some kinds recover, if planted in the open garden after all danger of frost has passed, and bloom freely in future years. This is especially true of hardy narcissuses.

Know What to Do

September-October

WITH somewhat cooler weather, we are more inclined to indulge in active gardening than we were on the warm days of July and August. In fact, we're rather eager to get some tasks under way and thus reduce the hectic pace of work next month. Most home gardeners concentrate all their fall work in October and early November—but gardening becomes labor instead of pleasure when everything cries for attention at once.

If you are planning to shift the location of any herbaceous perennials, you can now divide and move those which have finished flowering. Use only the strongest pieces from the outside of the clump, and replant at the same depth they were growing. Perennials which bloom very late, for instance, hardy asters, chrysanthemums, Japanese anemones, are best divided and transplanted in spring. Certain perennials, phlox, for example, should be divided only every third year — and peonies really resent disturbance. We have seen beautiful clumps of peonies with abundant blooms that have been growing, undivided, for over ten years. Of course, these clumps were getting maximum sunshine and were being fed with wood ashes, bonemeal, and a commercial fertilizer not too high in nitrogen content. Too much nitrogen promotes undesirable lax growth. When you do move peonies, dig around the clumps very carefully to avoid damaging the eyes; then make divisions with three to five eyes each, and plant them promptly.

Chrysanthemums that have been properly pinched should now be sturdy, bushy plants—not spindly ones. They require feeding as they come into bud, but not as the buds begin to show color. You can lift plants—provided you do so with a good ball of soil—to fill bare spaces in the perennial border or to give color to other drab spots around the home grounds. Actually, it is better to grow chrysanthemums in the cutting garden or a section of the vegetable garden and move them to the perennial border than to grow them in the border all year. In well-drained soil, and with a little protection, chrysanthemums usually winter satisfactorily; if the soil is heavy, they are likely to perish.

Hardy lilies are planted this month and into early October; but if bulbs are delivered later, you will be well advised to defer planting until spring. Lilies cannot endure a lot of moisture around their roots — they must have well-drained soil; so if your garden soil tends to be heavy, add some sand and humus. Deep planting — eight inches and even deeper for large bulbs — is the proper method for stem-rooting lilies (rooting above the bulbs); but some kinds, such as the Madonna and Nankeen, which are not stem-rooting, are planted only three to four inches deep.

Narcissi are planted this month and into October. Early planting enables the bulbs to develop a strong root system before the ground freezes hard. Strong roots prevent them from being heaved by alternate freezing and thawing and assure growth activity early next spring. Narcissi can be naturalized in meadows, at the edge of woodlands, in rock gardens, as well as being planted in mixed borders. Naturalized, they can be left undisturbed to increase freely. The little bulbs — chionodoxas, scillas, grape-hyacinths, galanthus, camassias — can be used in like manner very effectively.

Tulips are planted in October and well into November; in fact, we recall planting five hundred bulbs of 'Mrs. John T. Scheepers', 'Carrara', 'Insurpassable', 'The Bishop', and 'Clara Butt', on a very cold fifth of December some years ago. The ground had frozen two inches deep; we lifted the soil in blocks, planted the bulbs four inches deep, covered them with friable soil, then laid the frozen blocks across the bed. In May, we enjoyed superb blooms on tall, straight stems.

Tulips demand well-drained soil; in preparing it, incorporate humus in one form or another and a liberal amount of bonemeal. If you use manure, use well-rotted manure; never let fresh manure come in contact with bulbs.

Dig up, when fully matured, such tender bulbs and tubers as gladioli, mont-

(Continued on page 156)

FROM MUD TO MARIGOLDS

Know How To Do It

By **A. C. Pfander**

ONCE UPON A TIME the lady of the house, in addition to the household duties, was the one who took care of the family's garden. Today, she may be the head of a corporation, someone's confidential secretary, or a research assistant in a laboratory, and the home and garden are no longer her responsibilities alone — they are shared with her husband.

There are thousands of families where both husband and wife follow a profession or business, and the garden has become a place of relaxation for evenings and weekends. The maintenance problem is a serious one. Competent gardeners are hard to find, labor prices are high, and the work is too time-consuming to be undertaken by the owners. They frequently find themselves so busy taking care of the garden, they have little time to sit back and enjoy it.

What can we do about this problem? A garden with a minimum of maintenance? Let's have a try at it.

Of course, in every garden there is basic work which cannot be eliminated. Lawns must be cut at regular intervals, weeding is an unavoidable operation, shrubs need attention to keep them in good condition, and seasonal chores must be followed through. But let us see what we can do to keep garden tasks at a minimum and still have attractive surroundings around the home.

Most gardens are overplanted for immediate effect and underprepared for the welfare of the plants. A home owner who will get the best padding for a medium-priced rug, will plant the best of plants in the worst kind of subsoil—whatever happens to be there —without a thought of soil preparation. This is a waste of time and money, and poor results are inevitable. Soil well prepared and planting spaced for future growth are two principal requirements for permanent satisfaction.

To create a garden for weekend enjoyment is just like furnishing a room for a certain purpose. Plants are selected for their permanancy and in a manner which takes the intended use of the garden into consideration.

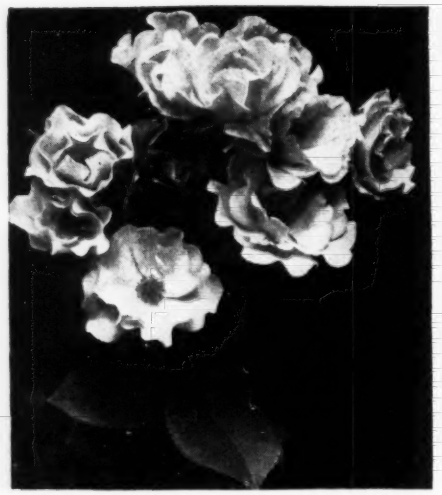
After the initial plan has been made and the soil properly prepared, we move along to the background planting. Privacy is a "must" in many cases and in others it is necessary to screen out unsightly objects; both can be achieved by *screen planting* with hedge material or by a mixed background of trees and shrubs. In background planting, the placing of shade trees is the first step; and for good landscape effect the year round, a proportion of evergreens should be included. To make the background effective against intrusion, a double wire can be pulled through the center of the hedge or through the shrubs without being visible. This is highly recommended for home properties where the adult members of the household are away during week days. A combination of conifers and broad-leaved evergreens, some flowering shrubs judiciously placed for grace and color, a berry shrub or two to attract birds, and medium-sized trees strategically placed for shade and comfort will furnish the basic background necessary for a good garden.

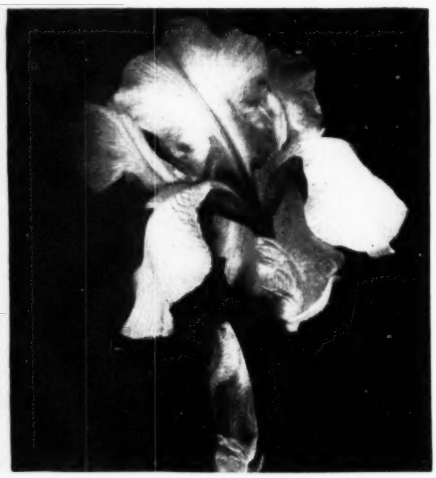
Narcissi are delightful against a background of shrubs.

Groundcovers (euonymus, ivy, pachysandra, vinca) should be introduced between shrubs to avoid excessive weeding, and a carefully selected number of perennials for continuous bloom from spring to fall should be planted to provide accents of color throughout the garden. All plants must have both winter hardiness and reliable growth habits so that results are dependable under normal conditions.

What is more delightful in spring than the first snowdrops? They grow happily at the outer edge of a shrub; a colony of twenty-five to fifty, to start with, will increase in a few years into a substantial drift and bloom as soon as the snow is gone in the first mild days. The foliage is tidy and disappears very quickly without becoming objectionable. Next come the grape-hyacinths, a beautiful powder-blue on short spikes, very easy to plant and lovely near *Alyssum saxatile,* which shows its gold at the same time. Narcissi and tulips are certainly very beautiful, but their foliage after the blooming period presents something of a problem until July, when it browns off, matures, and can be removed.

An easy doer in any garden is the bearded iris obtainable in every color of the rainbow. It makes an excellent point of interest for a few weeks in early June, demands only the cutting of the flower stalk after blooming, and dividing about every two years or so. A modest number of roses will go through the entire summer, blooming intermittently with seasonal care; and again the color range is so wide that every preference can be satisfied. Lilies against a shrub background make an elegant showing and should be used more often in gardens generally. Peonies are desirable permanent perennials, their foliage remains attractive long after the beautiful blooms have passed in June. Day-lilies from pale yellow to deep maroon, with flowering periods





Floribunda roses bloom intermittently in summer; peonies remain attractive after flowering; iris add enchanting colors in June.

extending from early summer till fall, will give interest in partially shady spots as well as in full sun. The foliage of some day-lilies tends to be somewhat unattractive, and so they should be planted away from the immediate foreground. A select number of hardy chrysanthemums is excellent for late season interest; the clumps should be divided in spring for good results.

Planting around the boundary lines with open areas of lawn or paving is more economical than cluttering all the available space with shrubs and patches of plants.

The simple plan of setting off the home tastefully and framing the property is still basically the best. This does not imply that the entire boundaries should be planted or fenced. Tight enclosures have a tendency to shrink the property, and vistas enlarge and enhance it. A balance struck with common sense is always necessary.

When entertaining is important, the owners will want a sizeable free area, either in lawn with some shade trees or as a paved section (patio), or they may prefer to have the garden as a whole designed in such a manner as to allow for the use of garden furniture either informally or in close groups. There is an unlimited variation in the planning for individual taste.

These are just a few ideas to suggest the happy medium between a green concrete "lawn" and awning, a wall or high fence around the property, and a pleasant, yet inexpensive garden of interest and usefulness for rest and recreation—and easy to maintain.

A WAY OF LIFE (from page 141)

kindred spirits. The American Iris Society has recognized this need and met it by the Round Robin Letter Exchange. It is seldom that two devotees of the iris live close enough together to encourage and inspire each other; therefore, the letter Robins — each limited to ten members — are a blessing. One of the rules is that first names must be used in addressing each member. And so, when one has been writing to Helen, Ruth, Nelson, and Edwin for a number of years, it comes natural to call each other by first names when we are fortunate to meet face to face. Scattered over the United States and Europe and even South Africa are many garden friends whom I call by their first names even at first meeting. What nice people gardeners are—one is seldom disappointed on meeting them.

When the garden is put to bed in November, it's time to renew old friendships with Father David, with "Chinese" Wilson, with Reginald Farrer, with David Fairchild. The latter's book, *The World Was My Garden—Travels of a Plant Explorer,* is one I love to dip into every once in a while for I, too, was once an "Insect Explorer" in the Philippines. And even now, at the drop of a hat, I would be off to distant lands to try my luck at finding some miraculous medicinal plants which would benefit all mankind.

Being a gardener, one is never bored. Days are seldom long enough, and when the body gets tired, the mind and spirit still carry on the pleasant preoccupation. In winter, if one is fortunate enough to be able to travel to the tropics, another new world of plants and gardeners can be explored. Traveling is like living another life in addition to one's usual one. And then, how pleasant to return to one's own garden laden with plants, seeds, and memories of new garden friends. Fairchild said "The World Was My Garden," but I should like to take the liberty to rephrase it to "The World Is In My Garden."

PERENNIAL BORDER (from page 149)

at least. Although it blooms earlier, baptisia is a becoming neighbor; so are *Campanula lactiflora, Salvia azurea,* Michaelmas daisies, and boltonia.

The perennial border, it must be admitted, is difficult to manage. Possibly, in our climate, its days are numbered: it takes too much care, it has too many "off" moments. But as a display piece, at its best, it is a catch at the heart, a wonder, and our great public gardens may do well to preserve it, if only to carry on those plants that might otherwise be lost.

KNOW WHAT TO DO (from page 154)

bretias, tigridias, ismenes, galtonias, zephyranthes, begonias, cannas, dahlias. They should dry out in a cool, airy place, then be stored in a cool frostproof room or cellar for the winter. If you have a cool greenhouse, you can put the dahlia tubers under one of the benches where they will remain plump but dormant, until you are ready to take cuttings in the spring; otherwise, pack them in sand, peatmoss, or sawdust so the tubers will not dry out too much. You can handle begonia tubers the same way, also cannas. Gladiolus and montbretia corms may be placed in shallow trays.

October is a good time to transplant

early flowering shrubs, including lilacs —give them a liberal supply of water, being sure the ground is saturated. A mulch is also beneficial.

Evergreens, especially the broad-leaved, should be watered thoroughly. Supplied with sufficient moisture, these plants are better equipped to withstand winter conditions.

Save leaves—don't burn them. Find a corner of your property where you can heap them up and allow them to decay. Leafmold is a very valuable aid to good gardening.

OLD TOMES (from page 144)

owned the first edition of 1731 with plates finely colored, text in French and English, and he was probably a subscriber in advance of publication.

Catesby's work in Carolina at once draws attention to a curious volume of drawings, carefully bound, and entitled: "A Volume of above Three Hundred dried Plants, produced in North and South Carolina, collected, drawn, and coloured from Life in 1767 by William Young, Jr."

Where are these drawings now, under what circumstance were they produced? And what has become of the books Dr. Fothergill loved—dispersed when sold the year following his death in 1780, at an auction sale? Perhaps some of them may have drifted into collections at the British Museum or to the Linnean Society at Burlington House. Perhaps I looked at some of them displayed in glass cases at an exhibition by the Society of Herbalists in the summer of 1953 in London. Perhaps, like other English treasures, some may have been brought overseas to the Library of Congress or to other American libraries, such as the exceptionally fine collection which The New York Botanical Garden possesses where among its books copies of many of the important botanical works described here have an honored place.

BOTANIC GARDENS (from page 135)

were sent out; horticulture and botany marched together. Aiton's *Hortus kewensis* served for the convenience of growers and was at the same time a botanical landmark.

Other famous European botanic gardens were founded at Montpellier (1593), Berlin (1679), Madrid (1755), Stockholm (1791). The idea was carried from Europe to the New World. When His Majesty Charles III of Spain sent a scientific expedition to New Spain (i.e. Mexico and Central America), one of its objects was to establish a botanic garden in which instruction should be given in botany and in which the native products of the country should be cultivated and preserved. The expedition landed in Mexico in 1787, and Martin de Sessé, its energetic director, at once sought to establish a botanic garden. He wandered from one proposed site to another, hampered always by the hostility of the university, which saw in the proposed institution a rival; the garden was established for a while in some muddy flats recently reclaimed from the lake bottom and dignified by the name of "el sapo" (the toad), to which the students could not make their way in the rainy season; finally it wound up in a court of the viceregal palace, where the remains of it still flourish as a pleasant formal garden without botanical pretensions. Instruction was in charge of Vicente Cervantes, who modeled his course on that given by Cavanilles in Madrid, and made it so popular that it became part of a liberal education for the young gentlemen of Mexico, besides a necessary element in the training of physicians. Cervantes was universally liked and respected, so much so that he was able to maintain himself and his garden through the bitter years of the revolution, until he died in 1820. After his time the garden gradually declined. Botanical research has become established in an institute in Chapultepec, which houses a valuable herbarium and library; but this is not, properly speaking, a botanic garden.

In the United States the first botanic gardens were the private gardens of celebrated persons addicted to botany. These included James Logan in Philadelphia, Christopher Witt, John Clayton, and, of course, John Bartram. Bartram traveled extensively in North America and brought back all sorts of plants to grow in his garden; this contained also many plants sent by his numerous correspondents. He was a botanist of note, and his garden is often said to be the first botanic garden in America—it was begun about 1728. But it was a botanic garden only in a very restricted sense—as being the garden of a botanist; and as such it was antedated by those of several of his friends. It was not planted in any system. He cultivated his rarities in all sorts of places, wherever they would grow; and was heard to say that all Pennsylvania was his garden. In 1760 he added a greenhouse. His garden certainly became famous and was sought by visitors interested in botany; also certainly it had no horticultural pretensions, and was not used for teaching. It finally became a nursery.

Another famous botanist of early days in America was the Frenchman André Michaux. Like Bartram he began as a farmer, and later became filled with the

Red bird on hickory tree, left. Black squirrel and ladyslipper, above; both from *The Natural History of Carolina, Florida and the Bahama Islands* by Mark Catesby.

desire to introduce new plants to cultivation. Like Bartram he traveled widely in North America for this purpose and established a nursery to care for his discoveries (which he intended finally for France). His first garden was in New Jersey, begun shortly after 1785. Then he went south, and made Charleston his headquarters. Again it is questionable whether his garden, though stocked with rare and new plants from all over the world, can be called a botanic garden. Not only did he collect plants in America, he received plants from the Old World for introduction into the New; our "mimosa" *(Albizzia)* came to this country through Michaux. Finally he had to return to France, and his garden passed into other hands.

A little later and a little nearer home, Dr. Hosack started his well-known garden in New York, where Rockefeller Center now stands (it was then his "country residence"). This was named the Elgin Botanic Garden and was designed for public enjoyment and instruction in botany. Hosack himself, though a competent botanist, was no explorer, still less a nurseryman; he was a practising physician and his interest in botany doubtless began with a knowledge of simples, like that of Bonafede two hundred and fifty years before. The Elgin Garden was founded in 1801. Hosack soon found it too expensive for his private means and persuaded the state to accept it in 1807. Later, in 1814, the ground was leased by the state to Columbia University and ceased to be a botanic garden.

Aside from this private venture, true botanic gardens (excluding the gardens of Bartram, Michaux, etc.) have depended upon governmental or institutional patronage, as in Europe, or upon permanent endowments. The first such garden has already been mentioned: the one in Mexico. Harvard University founded its garden in 1807; at the time of its dissolution, only eight years ago, it was the oldest botanic garden in America. It became famous under the direction of Asa Gray; but the enormously valuable collections of dried plants which he amassed became more important than the garden of living plants. The Gray Herbarium outlived the Cambridge Botanic Garden, and now no longer occupies the old site.

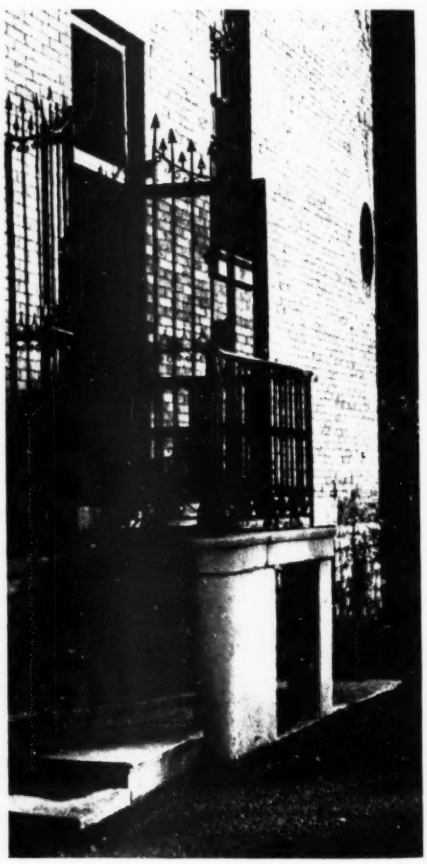
The development of herbaria has been a general feature of the development of the great modern botanic gardens. Though all branches of botany—physiology, genetics, pathology, etc.—have been and are studied in botanic gardens, that branch which is most dependent upon collections, living and dead, is taxonomy, the science of classification. And taxonomy is also the kind of botany first demanded by the plant grower, who wants names for the plants he grows, whether for instruction, for display, or for sale.

When Henry Shaw, an Englishman who had settled in St. Louis and made a substantial fortune there as a merchant, opened his extensive garden to the public, and endowed it as a botanic garden, a large herbarium formed part of the establishment. The garden was instituted about 1860. The nucleus of the herbarium was the large private collection of Dr. George Engelman, a St. Louis physician. Today this is one of the important centers of taxonomic research in the world. The first director, after Shaw's death in 1889, was William Trelease. For many years Jesse More Greenman was the head curator of the herbarium; he trained many students in taxonomy, whom one finds now as teachers or investigators in many of the great institutions of this country.

Similarly the Royal Botanic Gardens at Kew, after passing through a period of obscurity as a pleasure garden and a collection of exotic species, became important in research with the appointment as director of William Jackson Hooker in 1841. He came from Glasgow, bringing with him his personal herbarium; this was the nucleus of the present vast collection of five million specimens (or thereabouts). Collectors went from Kew to all parts of the world—Masson, Nelson, Cunningham. After Hooker came his son, Joseph Dalton Hooker. The staff assembled under him studied the floras of almost all parts of the British Empire. Besides this service to science Kew introduced many new plants to commercial culture. The famous voyage of Captain Bligh to obtain breadfruit was sponsored by Kew. The quinine plant was brought from South America to India in 1860 under Kew's auspices. At Kew's instance the original seeds of the rubber plant were collected in Brazil in 1875 for the institution of the great rubber plantations. Kew is part of Her Majesty's government. It also trains gardeners. And it is a park visited by a million or more persons every year, in which they may wander in beautifully laid-out avenues of trees from all over the world, see plants in economic and botanic gardens, enjoy rare tropical plants in great glasshouses, besides ap-

Below. Shaw's mansion became the herbarium of the Missouri Botanic Garden.

Right. Several generations of botanists have entered through its door.



preciating the rockery, the formal and informal rose gardens, and other decorative plantings, and may take their tea in sight of the vestiges of the romantic period — the "Roman arch" and the pagoda.

So it has gone in all the great centers of learning. The Berlin Botanische Garten was developed by the great Adolph Engler, and housed one of the important collections of the world — unfortunately largely destroyed by bombs in the second World War. A feature of the plantings was the arrangement of wild species from all over the world in miniature landscapes — hills and valleys — representing their homelands; one could wander over the earth and sample its vegetation in half an hour. One of the largest herbaria is in Geneva. Another famous botanist, Auguste Pyramus de Candolle, went there from the University of Montpellier in 1817 with the understanding that he found a botanic garden. Today the Jardin et Conservatoire Botaniques de Genève house some three million specimens and a famous botanical library.

In 1891 Nathaniel Lord Britton was appointed Professor of Botany in Columbia University in New York. He married another botanist, Elizabeth Gertrude Knight; and together they went to Europe to study specimens collected in America and deposited in European herbaria. It is related that Mrs. Britton especially was so impressed by what she saw at Kew that she resolved that New York should have something comparable. When they got home, they interested the Torrey Botanical Club, which sent out an appeal for funds. An endowment was created; the city set apart land and provision for its maintenance as a garden; and The New York Botanical Garden was born—the infant among the great gardens. Though it opened its doors to the public only in 1900, its herbarium now numbers two and a half million specimens and its library some sixty thousand bound volumes. The herbarium of John Torrey is deposited by Columbia University at the Garden, with the extensive collections of Britton in the West Indies. The flora of the eastern and southern United States is well represented there, also that of the great plains and the Rocky Mountains, and of northern South America. More recently Elmer Drew Merrill (who passed away the other day) gave the Garden his vast collections from southeastern Asia and the Pacific islands. The library includes a good sampling of the old herbals, besides extensive runs of periodicals, and all modern botanical works; and has the distinction of being the only botanical library to include horticultural literature also on a large scale. The Garden has carried on work also in plant diseases, plant breeding, and plant physiology, and has contributed to economic botany—it was here that puffed wheat was invented. Displays and collections of plants, indoors and out, have attracted a large public. Even the mothers with their babies and the gentlemen with their dogs, with whom I began—even these, if they know nothing of plants when they come into the gate, can scarcely leave without an enhanced appreciation of the living world about them.

PLANT COLLECTING (from page 147)

A vast horticultural reservoir that ecologically seems more suitable remains untapped in the interior South American lowlands. The middle and upper Orinoco have a great number of endemic (and what appear to be horticulturally of high potential) species. One very prominent example is the family Vochysiaceae, with highly ornamental shrubs or trees of several genera; the common coastal species are large trees of the high forest, but along the Orinoco are many floriferous bushy kinds. This neglected field for collecting may well be fruitful for the apartment windows of New York City as well. Such collecting requires the discriminating eye and training in the care of living plants of an experienced plantsman, a facility possibly (or even probably) lacking in the usual taxonomist. The Garden taxonomists can, however, offer to horticulture the *sine qua non* of tropical exploration, logistical knowledge.

Temperate American Collecting

Everything that is necessary for a collecting trip in the United States can be packed into the back of a station wagon, if one works at it. Three presses, each with a hundred corrugates and two hundred blotters; several milk-boxes of newspapers or blank newsprint; some empty milk-boxes to hold the specimens after they are dried; two vascula; a tent; air mattresses and bedding; food; a camp cook set and a folding camp stove; a folding metal frame to hold a drying press; gasoline for the stove; a couple of small picks, a hand ax, and a shovel: all of these will go in, and with a little effort the tailgate can be shut.

Campsites, like hotels, vary. A barren, waterless spot, flat enough to roll out a sleeping bag, may serve if necessary. A forest camp, with shade, tables, piped spring water, and other conveniences, can often be used as a base of operations. There are, of course, problems. I have killed rattlesnakes alongside the tent in desert campsites, and argued at midnight with bears in forest camps. Of the two, I prefer the bears. One of our camps in Montana was raided repeatedly by a bear which, because of his determination to return, we named for a well-known five-star general. All considered, however, he was a fairly inoffensive bear. He never hid his presence, and he never offered to come into the tent. I would rest more easily in the desert, if I could be as confident about snakes.

Collecting may begin even before camp is set up. Frequently there are plants along the road that merit attention. Aside from native plants in the less disturbed areas, there are roadside weeds to be examined. Weeds are often neglected by collectors, and the more recent introductions may be much more widespread and abundant than herbarium records would suggest. *Filago arvensis*, a woolly little annual weed of Eurasian origin, was first reported from North America in 1945 on the basis of specimens collected in British Columbia in 1942 and 1943, but the same species had been found by an amateur botanist in Idaho as early as 1934. More recently, in 1953, the species was reported from Michigan as a "second North American record." There are now several collections of *Filago arvensis* from Idaho in the herbarium of The New York Botanical Garden, but none from other states. It is a fair distance from Idaho to Michigan, and botanical observation along roadsides in the intervening area might turn up a number of new state records.

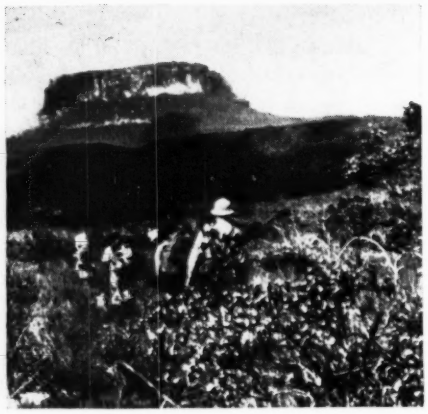
Once set up in camp, the botanist prospects about in the immediate vicinity to see what is available. There is no use carrying a specimen five or ten

miles over the mountain, if the same thing can be had a hundred yards from the tent. Away from camp, some collectors carry a small press containing only blotters, and work directly into it. Others, myself included, prefer to collect into a vasculum. This is a long metal can which can be carried by the handle or slung over one shoulder by a strap. Most specimens keep very well in a vasculum if they are liberally interspersed with wet newspapers to prevent their drying out.

Back in camp, the botanist may press the day's specimens at once, or, if it is late, he may moisten them again and let them wait until morning. Often after a cool, wet night in the vasculum the specimens are fresher and crisper then they were when collected in the hot sun the previous day. There are, however, two other problems to be met. Some plants drop their corollas so readily that they cannot be left overnight in any case. Collectors soon learn which groups must be put up as soon as possible because of this regrettable tendency. Also many plants have such a strong negative geotropic response that the tops will turn firmly upwards within a few hours, no matter what the position of the can. Therefore if the vasculum is to be left overnight, it is often advisable to stand it on end, so that all suspected plants are already upright.

One advantage of collecting into a vasculum and putting up the specimens at camp is that more care may then be devoted to cleaning and arranging them. Often the nature of the underground parts furnishes the best ultimate distinction between two species, and unless size prevents, these parts should be retained with the specimen. It is frequently useful to record on the label the type of soil in which a plant grows, but a soil sample is not properly part of the specimen. Often the only way to get a clean specimen is to wash the roots. This can easily be done in camp, but it is not always possible at the site of collection.

By the judicious application of heat, specimens can be dried overnight, and most botanists who collect extensively prefer this method to the time-consuming traditional process of changing and drying blotters regularly for about a week. In the field it is customary to use a two-burner gasoline camp stove of a



Garden botanists collected on the slopes of Ptari-tepui in 1952. No one has yet reached the top of this mountain.

well-known brand, which will burn unattended for several hours when set very low. The press is turned on its side and is held about two feet above the stove on a folding or take-down metal rectangular frame whose four walls guide the heat upwards so that a current of warmed air passes through the corrugates. The press must be kept tight while it is being heated; otherwise, the leaves and flowers shrivel. The necessity for frequent tightening can be minimized by letting the full press sit for a day or overnight before putting it on to heat. Many plants keep their color better when dried with heat than without. A little too much heat, however, turns the specimens brown. Unexpected irregularities in the behaviour of the stove can lead to more serious difficulties. The prize-winning and all too accurate limerick at a gathering at my home several years ago was

There was an elongated Swede
Who loved both his drink and his feed.
He collected wild flowers
For hours and hours,
And then burned them up with great speed.

The collector in the western United States does not expect to find many new species, although occasionally one does turn up. His main function, instead, is to help accumulate enough specimens so that names already proposed during the exploratory stage of the region's botanical history can be properly evaluated. Many supposed species are reduced to synonomy when it is shown that the characters thought to distinguish them are, in these instances, inconstant and do not actually mark self-perpetuating natural populations. Other names which had been skeptically received sometimes prove to be perfectly valid. In the exploratory stage of botany it is necessary to describe "new" species on the assumption that differences which mark species elsewhere will also prove to be of specific importance in the case at hand. Botanists vary in the skill with which they make such assumptions, and a plant which one botanist refers to a known species may be hopefully described as a "new" species by some "eager beaver." Thus a very large proportion of the real species of vascular plants in the western United States had been named and described before 1920. The present task is to determine which of the published names represent real species, and which represent more aberrant individuals, or ecological variants, or local or regional races of previously known species. The observation of natural populations in the wild and the collection of specimens to represent these populations are essential preliminaries to the proper completion of this task.

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BOOK REVIEWS

THREE PLANT SOCIETY YEARBOOKS

Plant societies, each one devoted to the study and culture of one kind of flower, are more numerous in America than anywhere else in the world. And each, with its devoted following and publications, is the force behind the advance made in developing new varieties of the flower and its expanding use in gardens and as a personal hobby.

The large memberships of many societies make it possible for them to publish yearbooks. Each volume in itself is a progress report on the most significant developments of the year and also offers a medium for amateur gardeners in all parts of the country to record their observations of variety behavior.

Three of these valuable volumes are currently at hand. Oldest in point of service to members is the American Rose Annual, now in its forty-first edition. This volume is dedicated to Professor L. M. Massey of Cornell who has reported down through the years since 1917 on his studies of methods for controlling rose diseases and pests.

Lead article in the 1956 Annual is by Edwin De T. Bechtel, written as a travelogue of western Europe in which he recounts in his usual delightful manner his visits, with Mrs. Bechtel, with famous rosarians and reports on the roses and gardens seen there.

Throughout the two hundred and sixty-two pages of this volume is a full fare of rose reading, some thirty-eight titles in all, ranging from seed germination and maintaining soil fertility to a most timely topic, "Difference in Resistance to Spring Freezes in Rose Varieties," by Dr. H. R. Rosen of the University of Arkansas.

The "Proof of the Pudding," which is a major feature of the Annual each year, gives members of local rose societies a chance to report personally on the performance of recently introduced roses that they have grown in their own gardens. The digest of their comments on scores of varieties covers eighty pages. The American Rose Annual is available with membership from the American Rose Society, Columbus 14, Ohio, for $4.50.

The thirty-first edition of The Gladiolus services in a similar manner all gladiolus fanciers. In this two hundred and thirty-eight page issue, there are nearly fifty articles. Since exhibiting gladiolus at shows is a universal pastime with the society members, there are numerous articles on growing and showing, discussions of relative quality of varieties, and a significant article on judging. The annual symposium gives a cross-the-board listing of winning varieties in all classes at thirty-one leading shows. Top winning varieties this past year were 'King David,' first, and 'Spic and Span', second.

Additional topics include hybridizing, germinating bulblets, high-crowned versus flat bulbs, harvesting corms, and notes on miniature varieties. The Gladiolus is available with membership from the New England Gladiolus Society, Horticultural Hall, Boston 15, Mass., for $3.00.

Youngest of the three plant groups is the American Hemerocallis Society, which celebrates its tenth anniversary with a specially fine two hundred and six page issue of the Hemerocallis Journal printed on slick paper. This book has a more personal, homespun atmosphere than the others. Many short items have come from "hem" fanciers all over the country, each passing on helpful tips, variety observations, ideas for civic plantings, or whatever is of current interest.

There are solid pieces as well, including one on breaking seed dormancy and several on hybridizing. This society has a very active Round Robin section, and the correspondence from this group has yielded a dozen pages of short items of special value to amateurs.

The list of registrations of new varieties reveals the amazing wealth of novelties being named and presumably put on the market. It's hard to believe that within a year over six hundred new varieties have been released in this country, and also hard to conceive that each one is sufficiently superior in its way to existing varieties to warrant its being named and released. This is one of the major problems confronting the registration committee of this society today.

The complete membership list is printed at the end of this volume. The Journal is published quarterly by the American Hemerocallis Society, 7714 Fairfield Road North, Minneapolis 12, Minn., and is available with membership for $3.50.

PAUL F. FRESE
White Plains, N. Y.

SUNSET LANDSCAPING FOR WESTERN LIVING. 192 pages, illustrated, indexed. By the editors of Sunset Magazine. Lane Publishing Co., Menlo Park, Calif. 1956. $2 (paper bound)

Garrett Eckbo's *Landscape for Living* just might have inspired the title, but one quickly forgives Sunset because the editors condensed a vast amount of good information into a small volume at modest cost. The works of more than fifty western landscape architects were brought together for this book, according to the authors.

The title implies application to the West exclusively. Such is not the case. Although California work is photographed almost entirely, the illustrated principles of handling space, form and texture are universal, and the greatest value of this book, to us in the East, lies in the mental gymnastics of adaptation to eastern ground-form, plant material, and habits of living which it inspires.

The limitations of the camera are such that photographs of small properties are almost always, of necessity, confined to interesting details. To the layman, this is misleading and often dangerous for he tries to copy. Unity of organization in the plan as a whole can be shown most effectively by sketches. The authors do recognize this and include some drawings of the entire site in the opening chapters. More of these would be in order if this volume were directed toward the professional student, but if such had been done, much of interest and comprehension on the part of the layman might have been sacrificed.

"How-to-do" chapters include paving, enclosures, lighting, color, use of water, raised beds and even heating of the outdoor living areas. A good indexed list of plant materials is included, and many are discussed in detail. The eastern reader will be surprised to see that most of those plants suggested are old friends, thus proving that the book is not so exclusively "western" after all. Prices quoted in the "how to estimate" chapter are perhaps truly western, one must admit with envy, but are of comparative value and the approach used is good.

The book is an excellent buy for the person interested in developing or improving a small property, particularly those who personally intend to take an active part in the effort.

JOE W. LANGRAN
Landscape Architect
Philadelphia, Pa.

THE HOMEOWNER'S GUIDE TO LANDSCAPING. Amelia Leavitt Hill. 205 pages, illustrated by Alfred F. Muscari; indexed. G. P. Putnam's Sons, New York. 1954. $2.75

Many practical suggestions helpful to the novice are included in this little book on landscaping. The most valuable of these are concerned with construction and drainage. Actually, there is very little about the principles of landscaping which is novel or has not been better expressed by other authors.

The major weaknesses in this book are failure to offer more practical help in making a plan and in the selection of plant material. Particularly after the author makes it clear that this book is not concerned with cultural directions, would it not have been wise to omit the very inadequate information on soil preparation for a lawn, for growing perennials from seed, and for retarding the growth of lawn grasses and hedges by using MH 30 (the advisability of which is controversial)?

In a book of so few pages it is incongruous to find only eight and one-half pages on making a plan, yet five and a half on the decorative vegetable garden, eight on the alpine garden, five on the rose garden, five and a half on the swamp garden, and eight on garden shelters (those represented in line drawings surely not adding anything to the value of the subject-matter), and seven and a half pages on mechanical detail for laying out curved walks, triangles, diamonds, crescents, elipses, hexagons and six-pointed stars!

HOWARD W. SWIFT

THE KITCHEN GARDEN BOOK. Vegetables from Seed to Table. Stringfellow Barr and Stella Standard. 372 pages, indexed. Viking Press, New York. 1956. $4.95

The style of the garden section surely reflects the author's belief in and love of the home vegetable garden as a place for the entire family to get healthy exercise. There they can make profitable use of their time while exposed to as much or as little sun as desired. Above all else the author believes home gardening the only way to get acquainted with flavor of all vegetables at their best.

This book is written for the fire-side reader rather than for ready reference or a text. The author wisely recommends making the acquaintance of experienced local gardeners and referring to publications dealing with vegetable growing for one's own area.

"Vegetables From Seed to Table," is a non-technical appeal to join into the group of lovers of this healthy and profitable outdoor exercise. The chief reason for home gardening is to have fresh vegetables of the very best quality. That the author is mainly concerned with the superior quality of fresh vegetables is emphasized by the complete absence of pictures, and sketches which would appeal to the eye and help teach gardening but which would not reflect on the quality of the harvest.

The author repeatedly calls attention to the need of good soil, especially the need for organic matter and to the values of a mulch for better production and soil improvement.

Like nearly all books on gardening that have to cover the whole country, only very generalized suggestions can be offered, and even then one may be left puzzled by the apparent contradiction of the many writers on gardening. Thirty-two vegetables are written up in some detail.

Part 2. "Cooking Vegetables" and no nonsense about it! Would a gay picture of some of the resulting foods have aided in the sale of the book? If it is for seasoned cooks maybe not, but if it is to interest the young people "yes." They are brought up on picture stories and rely on the eye for a first venture into a hidden result. However that is the only negative statement to be made on Stella Standard's part of *The Kitchen Garden Book.*

This is a fine rule book for adding unusual tastes to the old stand-by vegetables which often need glamorizing to interest the family. It also introduces us to some seldom used crops such as okra, parsnips, leeks, artichokes, and others with tantalizing recipes.

Stella Standard's recipes are mouthwatering. They are easily read and followed. Many cooking tips are tucked in, which helps the new cook.

C. B. AND LONNELLE RAYMOND
Penfield, N. Y.

POULSEN ON THE ROSE. Svend Poulsen. Translated by C. Campbell McCallum. 160 pages, illustrated, indexed. Chas T. Branford Co., Boston, Mass. 1955 (Printed in Great Britain.) $3

Ever since *The Rose Garden* by William Paul was translated into Danish and published in Copenhagen in 1855, Danish rose growing has followed a pattern similar to that of England and Ireland with such modifications as the climate required. It is, therefore, no accident that *Poulsen on the Rose* might find some use in England.

In Danish it is a charming book, written with humor and a thorough knowledge of local conditions. The English translation, however, does not do justice to the labor expended by Svend Poulsen. Such expressions as artificial manures for chemical fertilizers sound rather awkward, at least in America.

The book covers rose growing in all its phases, mainly for the amateur, but it includes a chapter on commercial production of rose plants. Under a sub-heading in this chapter, Poulsen describes his method of hybridizing, which is most interesting from the standpoint of work required before the task can be started. Thus we find that the seed parents must be potted and carried in greenhouse in order to get ripe hips.

Probably few people in America would agree with Mr. Poulsen's selections of perennials to be planted with roses; still it would not hurt anybody to try some of his suggestions. To become acquainted with the way roses, especially polyanthas and floribundas, are used in Denmark and the rest of Scandinavia would be excuse enough to buy this book.

NIELS J. HANSEN
Washington, D.C.

ORCHIDS FOR HOME AND GARDEN. T. A. Fennell, Jr. Introduction by Philip Wylie. 130 pages, illustrated (drawings by the author); indexed. Rinehart & Co., New York. 1956. $2.95

This is the latest of a small group of books on orchid culture for the amateur. It is written in simple and understandable language and has many helpful drawings and several good color plates. The introduction is by Philip Wylie, well-known short story writer, who wrote the article on orchid growing which was published by the Saturday Evening Post several years ago. I believe that article has done more to stimulate general interest in orchid growing among amateurs than any other one article or book. T. A. Fennell, Jr., is very active in the firm of Fennell Orchid Company, owned by his family.

Orchids for Home and Garden is quite explicit in the methods recommended for growing various orchid species. For anyone interested in starting an orchid collection, or even the purchase of a few plants, this book will be very helpful, especially those living in southern states. But even for those in the northern part of the country, much information is available. The best types for beginners are suggested and the habits of the plants well defined.

All of the stages of orchid growing — from pollinating to sowing the seeds after harvesting, planting in a flask, transplanting to community pots, and repotting from there to blooming — are described very accurately. Instructions for repotting large plants and dividing are also very specific.

Insects and diseases which may bother orchids are rather well described and treatment recommended.

A chapter on corsage making and using orchid blooms in arrangements is very good, especially for a novice.

While this is a relatively short book, there is much information in it for beginners.

MARGARET ILGENFRITZ
Monroe, Michigan

ABC OF ORCHID GROWING. John V. Watkins. 190 pages, illustrated, indexed. Prentice-Hall, Englewood Cliffs, N. J. 3rd edition 1956. $3.50

This newly revised book is the finest I have read, and I certainly recommend it as a *must* for all amateur orchid growers. It is simply written and illustrated and covers every stage of orchid culture from the time of selecting good plants to the cutting and packing stage.

It contains an excellent reference chart which covers kind of orchid, where it blooms, when to pot, potting medium, temperatures and fertilizers, information which is of tremendous value to the beginner. It not only covers the general culture but contains an excellent section on special culture of the Genera.

The Appendix A and B contains valuable information on diseases and insects and the correct formula to use in combatting these pests and also an excellent glossary of terms which is not readily found elsewhere.

If you are an amateur and just starting out as an orchid collector or a well-established orchid hobbyist, you will value this book as an indispensable guide to keep on your bookshelf.

MARTHA M. DOIG
Miami, Florida

FLOWERS AND THEIR HISTORIES. Alice M. Coats. 348 pages, illustrated, indexed. Pitman, New York. 1956. (Printed in Great Britain) $7.95

The story of plants and their introduction into our gardens is a most fascinating one. In this delightful book the history of some six hundred kinds of familiar flowers are presented, interwoven with folk-lore and references to notable figures in the plant world of the past.

The great amount of research that went into the preparation of this book is indicated by the extensive bibliography, but it was obviously a labor of love, and the result is excellent.

For the sake of botanical accuracy, it should be noted that in anemones colored sepals have taken on the appearance of petals, these latter not developing. It was a surprise to see *Lavandula Stoechas* referred to as "a rather tender biennial species." Tender it may be in cold districts, but it is still a shrub capable of long life in a mild climate.

This is a book that will surely add to the pleasures of gardening by imparting a wider knowledge of many of the flowers we love. It would be a nice thing to anticipate a similar book on woody plants.

HENRY E. DOWNER
Poughkeepsie, N.Y.

GIVING AND GETTING AWARDS FOR FLOWER ARRANGEMENT. Emma Hodkinson Cyphers. 56 pages, indexed. Hearthside Press, New York. 1956. $1.95

The very title, *Giving and Getting Awards for Flower Arrangement* will interest the many hundreds of exhibitors and judges of flower shows of the National Council of State Garden Clubs, covering forty-four states. The general public, too, may learn why "that arrangement won a

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blue ribbon" when "this one looks so much better to me!"

Emma Hodkinson Cyphers, the author, is well known in this field for her courageous progressive thinking in *Flower Arrangements at the Crossroads* and others of her books of interest to flower show exhibitors and judges.

In this latest of her books, she pleads for a re-examination of many important objectives often lost sight of in a sort of mechanical evaluation of flower arrangements in flower shows. Mrs. Cyphers insists that it is important to look for the exhibitor's personality in the design expressed. She explains how an understanding of the exhibitor's work may be achieved beyond the mathematical scale of points provided. There is a plea for tolerance in judging—an analysis of special judging problems—all these leading up to that recognition of creative achievement which merits an award.

Perhaps this little book will encourage the exhibitors in flower shows to create more distinctive interpretations of flower show classes — away from the monotonous sameness of so many of our prize-winning awards in recent shows.

This should be encouraged by the right kind of judging of flower arrangements.

B. LOUISE HOFFMAN
Flower Show School Chairman
Federated Garden Clubs of New York State

STEPPING STONES TO JAPANESE FLORAL ART. Rachel E. Carr. 109 pages, illustrated. Published in Tokyo, Japan; distributed by P. D. and Ione Perkins, Box 167, South Pasadena, Calif. 1955. $5

This is a truly fine "Do-it-yourself" book and should be in the hands of all interested in arranging flowers in the Japanese manner. Pen and ink sketches on almost every page add visual interest; while the explanations on the opposite pages of the ten color and twenty black-and-white pictures help to educate the reader to assemble the separate units as pictured and numbered. The book starts with a commentary by two masters of Japanese arrangement schools and closes with a listing of the Japanese and English names of the plant materials most in use. Though really not necessary, it gives the reader the feeling that Mrs. Carr wishes to leave no stone unturned to help the reader understand Japanese floral art.

I enjoyed reading this book very much.

DIANA GILBERT
Larchmont, N. Y.

MAKE YOUR OWN CORSAGE. Dora Maud Aldridge. 118 pages, illustrated. Edited by Elizabeth Thompson and Catherine Laughlin; photography by Jimmy Jones Studios. Dorrance & Co., Philadelphia, Pa. 1955. $3

As this book unfolds the reader is seized with a desire to start at once to make a corsage.

Its many illustrations are clearly explained and from them one may discover a basic design for most occasions—for youth or adult. The numerous "durable" corsages contain an interesting assortment of dried material, seed pods, nuts, etc., glamorized with glitter for the holidays and in the natural state for ordinary wear.

The principles of corsage making are handled in an easily understandable manner with details of needed mechanics and information on proper conditioning of flow-

(Continued on page 165)

CHRISTMAS CARDS NOTEPAPER and OTHER GIFTS

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These and other articles may be purchased at the Garden — why not visit it? Or you may order by mail, if you will indicate your preference and rely on our discretion in the final selection.

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THE NEW YORK BOTANICAL GARDEN

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NEWS, NOTES and COMMENTS

COMING EVENTS

Opening of the New Laboratory Building. Appropriate ceremonies will be held on October 24, 1956, at which time the new Research-Laboratory Building of The New York Botanical Garden will be officially opened.

Course in Advance Gardening. T. H. Everett, Curator of Education and Horticulturist of The New York Botanical Garden, will conduct a Course in Advanced Gardening on October 22, 25, and 29, and November 1, 5-7 p.m., in the French Institute Building, New York City. Registration should be made through the Downtown Office of The New York Botanical Garden, 22 East 60th Street, New York City. Members will receive further information through the mail about the course, which is sponsored by the Volunteer Associates.

Christmas House Show. Six houses in New York City will be decorated for Christmas on November 28, 1956, under the auspices of the Volunteer Associates of The New York Botanical Garden. Details will be announced later.

Theatre Benefit. The Volunteer Associates of The New York Botanical Garden are sponsoring a theatre benefit on January 8, 1957—Judy Holliday in "Bells are Ringing" at the Shubert Theatre. Reservations, accompanied by check, are being accepted now by the Downtown Office of The New York Botanical Garden. Tickets for orchestra, $30, $25, $20, $15; for mezzanine, $20, $15, $10, $7.50.

Morning Lecture Series. The Morning Lecture Series, sponsored by the Volunteer Associates of The New York Botanical Garden, will be held in the auditorium of the French Institute Building, New York City, on January 10, 17, 24, and 31. The program and details will be mailed to members of the Garden.

The Director Returns from Europe. William J. Robbins, Director of The New York Botanical Garden, and Mrs. Robbins will return on September 19, 1956, from a trip abroad. Dr. Robbins visited nurseries and botanic gardens in England, Scotland, Ireland, Denmark, Holland, Belgium, and France. He presented a paper, "French Botanists and the Flora of the Northeastern United States" at the Conference on the Relation of French Botanists and American Flora in the Eighteenth and Nineteenth Centuries, held in Paris, September 13-16, 1956, under the auspices of the National Center of Scientific Research, an agency of the French government.

Three other Americans participated in the Conference: Dr. J. R. Schramm, formerly director of The Morris Arboretum, Philadelphia; Dr. Gilbert Chinard, a member of the Department of Modern Languages and Literature of Princeton University until his retirement a few years ago; Prof. Joseph Ewan, of the Department of Botany, Tulane University, New Orleans, Louisiana.

A Letter from Dr. Maguire. Postmarked Vienna, July 4, 1956, came a letter from Dr. Bassett Maguire, Curator and Coordinator of Tropical Research of The New York Botanical Garden. Dr. Maguire has been spending several months visiting and studying at botanical institutions on the European continent.

"The early part of our schedule had called for work at Paris, Florence, and Vienna. The continuous rains (given so much attention in the newspapers) prevented our seeing any of the gardens or countryside of France. It did become warm and the sun shone along the Mediterranean, where we drove for miles through the wonderfully symmetrical Mediterranean pine next to the sea.

"Professor Pichi-Sermolli took care of our botanical needs in Florence and introduced us to the charming beauty of that city. Many of his friends will be interested to know that Pichi is now on his way to a botanical and cinemagraphic exploration of Kilimanjaro in equatorial Africa.

"Here in Vienna we were fortunate enough to arrive before Professor Rechinger left on a field excursion to Macedonia. We are going through the rich collections of the Natural History Museum, extracting specimens which will be later sent to New York for study there, and leave at week's end for Munich, where we shall begin a search for historical materials that may have escaped destruction during the war.

"Altogether unplanned, the route from Florence to Vienna took us across the Alps through the spectacular region around Cortina, where the late Olympic winter games were held. We found ourselves compelled to remain for three days to walk through the lush green meadows in full flower, where *Ranunculus pedicularis, Valeriana, Campanula, Phyteuma,* several species of gentian, *Scabiosa,* forget-me-nots, and many other brightly colored plants made a flower garden of the open parks. Under the fresh green larch, *Erica* and rhododendrons were in beautiful color. In this region the European ladyslipper, *Cypripedium Calceolus,* is fairly common.

"Most exciting of all was the cable car trip up for more than a thousand meters into the peaks and snow catchments above timber. There an abundance of *Pinus Mugo* and dwarf willows formed the *krummholz* around which and on the talus grew unbelievably blue gentians, many brightly colored crucifers, androsaces, and soldanellas, the lovely "alpenglockchen," and eidelweis.

"Serious study will occupy us until we again see alpine landscape near Geneva in August. From Geneva we shall return to Paris to resume herbarium studies and make final selections of materials to be sent to New York."

Summer Activities of Dr. Keck. In the early summer, David D. Keck, Assistant Director and Head Curator of The New York Botanical Garden, spent six weeks in Claremont, California, with Dr. Philip A. Munz, Director of the Rancho Santa Ana Botanic Garden, putting final touches on a manuscript for a handbook entitled, *California Flora.* These two botanists are coauthors of the forthcoming Flora, which will be a ten-year project by the time it appears in print. It is their hope that the manuscript will be ready for publication early in 1957.

Among the botanical centers visited while in California, Dr. Keck was impressed also by two other thriving botanic gardens: the Los Angeles State and County Arboretum at Arcadia, where George Bunting of the herbarium staff at The New York Botanical Garden had just taken a position as botanist, and the Strybling Arboretum, Golden Gate Park, San Francisco, a beautifully arranged collection of exotics brought together on what was originally a most unpromising area of old sand dunes, principally through the foresight and energy of its soon-to-retire director, Eric Walther.

During his return to New York, Dr. Keck stopped in Michigan to deliver a lecture at the University of Michigan Biological Station at Douglas Lake and to give a series of three lectures at Ann Arbor as a participant in the Seventh Summer Biological Symposium presented by the Division of Biological Sciences of the University of Michigan.

Honors to Phil Alampi. Phil Alampi assumed the duties of the office of Secretary of Agriculture of the State of New Jersey on July 1, 1956. On June 18, during the sessions of the National 4-H Club Camp in Washington, D.C., Mr. Alampi was one of eight persons in the United States to receive citations for having made "distinct contributions" to the nation-wide development of the 4-H Club program.

Ruth Alampi will conduct the program "The Home Gardener," N.B.C. network, on which she performed with her husband until he took up his new post.

Manfred Wald died suddenly on July 7, 1956, of a heart attack while on a train traveling from Lindau to Munich, Germany. Mr. Wald was interested in the Garden's laboratory investigations and visited the laboratory on many occasions, giving generously of his experience and advice as a microbiologist. Mr. Wald furnished cultures of pink yeast, the vitamin requirements of which were investigated by the laboratory. He was elected a member of the Corporation of The New York Botanical Garden on January 16, 1945.

Trubek Grant for Research in Entomology. Trubek Laboratories, Inc., of East Rutherford, N. J. has established a fellowship grant of $2500 at Rutgers University for basic research in entomology. Dr. Bailey B. Popper, chairman of the Entomology Department of the College of Agriculture and Experiment Station, has been interviewing candidates for appointment to the fellowship, who will also earn an advanced degree.

The Chrysanthemum Society of New Jersey will hold its fourth annual flower show October 20-21, 1956, in the Dwight Morrow High School, Knickerbocker Road and Tryon Avenue, Englewood, New Jersey. "Lo—the Chrysanthemum" is the theme of the show, which will be open free to the public Saturday, 3-9 p.m. and Sunday, 2-6 p.m.

"Selective Clearing." The Upper Keys Garden Club has taken the first step to prevent destruction of native trees by un-

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necessary and promiscuous land clearing. In a simple but informative leaflet this garden club, composed of thirty-five women on the five islands known as Florida's Upper Keys, seeks cooperation from new land owners. It further offers the services of its members to mark trees that should be saved, so that when the inevitable bulldozer goes to work, the operator can protect the marked trees.

The next stop in the campaign to preserve the natural beauty of Florida's Upper Keys will be a more complete brochure, illustrating some of the trees and other distinctive flora which should be saved for future generations.

As a note from the Upper Keys Garden Club states . . . "it is not our problem alone, but one that exists in many other parts of the United States. We welcome suggestions." The club's postal address is Box 288, Tavernier, Florida.

Fiftieth Anniversary. The Botanical Society of America is celebrating its fiftieth anniversary this year and at a dinner at Storrs, Conn., on August 28, 1956, certificates recognizing "distinguished achievement in and contribution to the advancement of botanical science" were presented to fifty outstanding botanists. Among the botanists so honored were Dr. William J. Robbins, Director, Dr. H. A. Gleason, Curator Emeritus, and Dr. B. O. Dodge, Plant Pathologist Emeritus, of The New York Botanical Garden.

National Association of Gardeners. At the forty-second annual convention of the National Association of Gardeners to be held in Baltimore, Maryland, September 18-20, 1956, Dr. George H. M. Lawrence, Director of the Bailey Hortorium, Cornell University, Ithaca, New York, will give a talk on "The Real Gift of Liberty Hyde Bailey to Horticulture." Dr. A. O. Kuhn, Assistant to the President of the University of Maryland and former head of the Department of Agronomy, will discuss "Soil Fertility and Related Research."

The three-day program, with headquarters at the Southern Hotel, will include a trip to the U. S. Naval Academy at Annapolis and visits to old colonial homes and historic buildings.

New York Chooses Sugar Maple as Official State Tree. On April 10, 1956, Governor Averill W. Harriman signed the bill that officially designated the sugar maple *(Acer saccharum)* as the state tree. Through the efforts of State Senator Ernest I. Hatfield of Dutchess County, the bill was presented to and passed by the state legislature. The New York State Arborists' Association and the Federated Garden Clubs of New York State, Inc., were active in this movement. The former president of the latter organization, Mrs. John I. Lane, witnessed the signing of the bill in the Executive Chambers of the State House.

Rhododendron Occidentale. In his article, "What We Can Do About the Introduction of Plants"—see March-April 1956 number of THE GARDEN JOURNAL—John C. Wister mentioned the trips made by members of the Washington Rhododendron Society to collect forms of *Rhododendron occidentale* in the mountains of Oregon. The following information from Leonard F. Frisbie, President of the Washington Rhododendron Society of Puyallup, Washington, brings us up to date on their efforts.

—THE EDITOR

"To the present eleven forms have been designated by number. That includes the present year's field work when an all pink-flowered form was located in Josephine County, Oregon, and an all pale yellow-flowered form in Curry County, Oregon. Our Tacoma #157 is all white-flowered except for a very pale yellow blotch. The other eight forms have flowers which are blends of pink, white, and yellow. Tacoma #155 and Tacoma #158 have deep red buds and reddish foliage, and a good deal of red on the reverse of the flower and tubes. All eleven forms are far superior to the run-of-the-mill-form of this western azalea species. All are my own personal discoveries and selections, and naturally I am quite proud of them. The end of selection is not in sight as yet, though we feel lucky now if we find one or two in a season.

"One or more plants of each of these is now growing in Puyallup. This was stepped up a great deal this year and a large number of husky, self-layers was dug and brought back. Thousands of cuttings were taken and distributed to members for rooting in plastic tents. None of our transplants have flowered here as yet. We had budded plants last fall; but the November debacle froze the buds, so no flowers until next year. Dr. E. J. Kraus of Corvallis, Oregon, is of the opinion that colors may not be the same on northern transplants. We shall have to see—but we do not expect this to be a factor at all. In a very few years many of our discoveries will be in full flower production. Nurserymen are being brought into the propagation circle, so that the general public will eventually have access to the plants also. Personally, I have no commercial interest in the project—it costs me money, time, and lots of energy—but I have never done anything that gives more satisfaction, and have never tackled anything so fascinating."

RECENT ACQUISITIONS TO THE LIBRARY

Advances in Genetics. New York, Academic Press, 1956. Vol. 8. $9.00

Allen, R. C. What Every Rose Grower Should Know. The American Rose Society, 1951. $2.00

Crowell, Victor L., ed. The Wonderful World of New Jersey. New Jersey, Rutgers Univ. Press, 1955. $3.25

Dodge, Natt N. and Zim, Herbert S. The American Southwest; a Golden Regional Guide. New York, Simon and Schuster, 1955. $1.95 — paper $1.00

Eaton, Charles Edward. The Greenhouse in the Garden. New York, Twayne Publishers, 1955. $2.75

Gilbert-Carter, H. Glossary of the British Flora. New York, Cambridge University Press, 1955. $3

Hart, John Fraser. The British Moorlands. Athens, Univ. of Georgia Press, 1955. $2.00

Haupt, Arthur W. An Introduction to Botany. New York, McGraw-Hill Book Co., 1956. $5.50

Jaeger, Edmund. The California Deserts. Calif., Stanford Univ. Press, 1955. $5.00

Jones, George Neville and Fuller, George Damon. Vascular Plants of Illinois. Urbana, Univ. of Illinois Press, 1955. $10.00

MacLeod, Katherine. Bellingrath and Other Famous Gardens. New York, Comet Press, 1955. $1.50

Miller, Carey D., Bazore, Katherine, and Bartow, Mary. Fruits of Hawaii. Honolulu, Univ. of Hawaii Press, 1955. $2.75

The Most Beautiful Alpine Flowers; translated from the German by Oscar Konstandt. New York, W. S. Heinman, 1955. $1.50

New Zealand Birds and Flowers. New York, W. S. Heinman, 1955. $1.50

Shumway, Herbert D. Nature Photography Guide. New York, Greenberg, 1956. $1.95

Society for General Microbiology. Sixth Symposium. Bacterial Anatomy. New York, Cambridge Univ. Press, 1956. $6.00

BOOK REVIEWS (from page 163)

ering material carefully covered.

Chapters have been included on design and color, important features in this art, not only in selection of proper corsage for the costume to be worn, but in treating the problem of color in corsage design.

I recommend this book to one who wishes to create a corsage.

MARGARET DEL. GRUMBINE
Jersey City, N. J.

A TEXTBOOK OF PHARMACOGNOSY. N. M. Ferguson. 374 pages, indexed. Macmillan, New York. 1956. $7

Dr. Ferguson, Dean of the College of Pharmacy at the University of Houston, writes in the newer trend of pharmacog-

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nosy teaching. The drugs are studied under a biochemical classification rather than the formerly classic taxonomic basis.

His approach is less complete than that of some other authors. Regardless of the approach and emphasis, it is unfortunate that more accurate and complete information was not included on drug identification and commerce.

The selected readings for each chapter are very helpful. The subject matter is quite current (i.e., *Rauwolfia* is included) though no mention is made of the steriods from dioscoreas and agaves.

There are numerous charts but no pictorial illustrations. Admittedly, it is a textbook; however, it could be of interest and value to anyone seeking information about the chemical groupings and the constituents of natural drugs in common usage.

E. F. Woodward
Chief Pharmacognosist
S. B. Penick & Company

THE PLANKTON COSMOS

Although millions of books have been written, Davis' compendium *(The Marine and Fresh Water Plankton)* is convincing proof that it is still possible to produce a unique work. He brings together and synchronizes a tremendous amount of scattered but pertinent information about the aquatic world. There are facts, tables, and graphs to help the reader appreciate and to comprehend water and also what adaptations an aquatic organism must possess. All of this information is gathered selectively from the literature and from the author's own wide experience as an aquatic biologist. Whereas there is but little new information, it is the combination and synchronization, especially bringing descriptions of fresh-water and marine forms together under one cover, which make the book as unique as it is useful.

One who knows how much is involved in plankton and the planktonic environment is not surprised to find that the title is ambitious. In the first one hundred and forty-one (all too few) pages the author treats of the chemistry and physics of the aquatic world and of the factors which are related to plankton habits and distribution. Also here is discussed the conditions which determine productivity and abundance, variation in morphology, the chemical composition of plankters, and something of the kinds of organisms which are conspicuous in drifting biota. This section of the book is a veritable storehouse of carefully selected information, and whereas the reader who is searching for a particular set of facts may be disappointed, he should be pleasantly surprised with the material he does find.

In the next one hundred and thirty-seven pages the author nobly and bravely attempts to treat systematically twenty phyla of plants and animals. This he does by careful selection and by reducing an infinitely great mass of material on aquatic life to a mere skeleton (with some important units missing). In this treatment the author is to be commended, even though the specialist will not always agree with his classification system and with the emphasis that is given some groups to the exclusion of others. The Radiolarians (numerous to be sure) seem to come in for more than their share of consideration, both in the text and in the illustrations. Because of space limitations, no doubt, only brief, if interesting, descriptions are given of the biology of the organisms treated in the systematic section. The reader will wish, however, that the author had been able to use a consistent plan throughout. Methods of reproduction and life histories are noted only for some organisms. Morphology is well presented for form but neglected in the next treatment.

The usual pit-falls are encountered in keys to phyla and genera, and there are many points at which the less experienced reader will require the aid of a specialist to make the hurdle. Because of necessary brevity, the phycologist will be disappointed when he examines the section on plankton algae because whole groups have been omitted.

There is a brief but helpful and highly essential glossary and a well-selected bibliography of two hundred and seventy-four references. There are six hundred and eighty-one illustrations, mostly arranged consecutively in the back of the book. In respect to these, the book makers and editor were not altogether charitable to either the reader or the author. There is an unfortunate and exhorbitant waste of space in the plates — space which conceivably might have been used to advantage elsewhere. The figure legends do not appear with the illustrations. Such a book as this merits a more artistic and effective treatment and more expert mechanics in composition.

This book is bound to meet with success as a reference work and possibly also as a text. This may prove to be true because, although courses of study are particularized at the level where this book would be used, the student of fresh water is or should be keenly interested in marine plankton, and vice versa.

G. W. Prescott
Dept. of Botany
Michigan State University
East Lansing, Mich.

THE MARINE AND FRESH WATER PLANKTON. Charles C. Davis. 562 pages, illustrated, indexed. Michigan State University Press, E. Lansing, Mich. 1955. $10

LIVIA'S GARDEN ROOM AT PRIMA PORTA. Mabel M. Gabriel. 53 pages, illustrated with 36 plates. New York University Press, New York. 1955. $12

Here is an unusual opportunity to enjoy the trees, the plants, the flowers and birds found in the vicinity of Rome at the time of Augustus Caesar — all by the way of wall-paintings two thousand years old. These paintings were the decorations for an underground apartment of a villa done in the rich Roman tradition. They give the effect of looking off from a terrace into a garden where the trees and flowers are so realistic as to be seen at one's side in walking along the paths.

The author has a detailed analysis of each panel giving its composition, the colors, the location of each plant and flower, and the spot where the bird hovers—thus adding to the vividness of the portrayal.

The sixty-nine birds which appear in the scenes have a separate catalogue.

Finally, the author's statement that many of the flowers shown are the same as those in her own far away garden in California, link the long ago with the present.

This is an interesting book as well as a fine example of bookmaking.

Louella Otis Beaman
New York, N. Y.

LAWNS AND LANDSCAPING HANDBOOK. T. H. Everett. 144 pages, illustrated. Fawcett Publications, Greenwich, Conn. 1956. 75c

Home owners who read T. H. Everett's

(Continued on page 168)

Publications of THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada by H. A. Gleason and collaborators. Over 4,660 species described; each species illustrated; keys to families, genera, species; a complete glossary. 3 vols., $30.00, plus 75c handling and postage on domestic orders; foreign orders, full postage.

Flora of the Prairies, and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex, by K. K. Mackenzie. From Vol. 19, Part 1; of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marian A. & G. L. Wittrock in the Journal for March 1942. 25 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal, 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 25 cents.

The Flora of the Unicorn Tapestries, by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second Edition 1947. Third Edition 1950. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at The New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts, by E. J. Alexander. 64 pages, indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. Third edition 1950. 50 cents.

Review of Juniperus chinensis, et al., by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.00.

Periodicals

The Garden Journal of The New York Botanical Garden, bimonthly, designed to stimulate interest in the world of plants and the science of plant life, contains non-technical articles on botanical, horticultural and kindred subjects; also special departments — book reviews, questions and answers, news and comments. $2.00 a year. 35c single copy. Foreign subscription $2.50 a year.

Addisonia, devoted exclusively to colored plates accompanied by popular descriptions of flowering plants, 8 plates in each number, 32 in each volume. Published irregularly. Subscription price $10.00 a volume; not offered in exchange. Free to members of the Garden. Volume 23, No. 1 published November 5, 1954; Volume 23, No. 2, published November 6, 1955. Volume 23, No. 3, in preparation.

Memoirs of The New York Botanical Garden. A collection of scientific papers, issued irregularly. Vols. 1-6, to members of the Garden, $1.50 a volume; to others, $3.00. Vol. 7, to members, $2.50; to others, $5.00. Vols. 8, 9, $10.00

Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

North American Flora. Descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 100 parts now issued. Now in a second series. Not offered in exchange. Prices of the separate parts on request.

Brittonia. A series of botanical papers published in cooperation with the American Society of Plant Taxonomists. Subscription price of volumes 1-5, $5 a volume ($4 to members of the Society); volumes 6-8, $7.50 a volume ($5 to members of the Society). Now in its eighth volume.

Mycologia, bimonthly, illustrated in color and otherwise; devoted to fungi, including lichens, containing technical articles and news and notes of general interest. Official organ of the Mycological Society of America. Now in its forty-eighth volume. Subscription $8.50 a year, single copy $1.75.

NOTE: The price per copy of back numbers of the Journal is 25c; of back numbers (more than one year old) of The Garden Journal, 45c

All orders and inquiries should be addressed to

THE NEW YORK BOTANICAL GARDEN Bronx Park, New York 58, N. Y.

LET THERE BE HERBS

"We steal as in a castle, cock-sure: we have the receipt of Fern-seed, we walk invisible." Shakespeare's Henry IV.

Herb gardeners are accustomed to looking for differences in the foliage of gray and green plants of sweet aroma rather than depending on the flowers for recognition. So, for us, naming the species of ferns to be found in every woodsy place in the East should be relatively easy. That is what I thought last fall when I wanted to gather for a shady part of the herb garden some of the ferns of legend. The old herbals ascribe remarkable properties to some of the commoner varieties such as male fern, maidenhair, and polypody. Ferns generally were ingredients in love-philtres of olden days.

Though I could find a dozen different ferns within walking distance of my house, I was not sure which ones I was digging even though I took only those which were in great abundance. How I wished for a field guide to the ferns such as I knew was in preparation by a Falls Village botanist, with really identifiable drawings made from the actual plants by my sister-in-law, his neighbor. Almost three years had been spent in the gathering of all the ferns and fern allies from which the artist worked and then the final indexing and printing of the book took another season. Meanwhile, I began my fern corner under the shade of nearby trees with scattered rocks to make the little spleenworts feel more at home.

I particularly wanted to find some of the large ostrich ferns that another neighbor, Lewis Gannett, introduced to us in the form of fiddleheads, a frozen vegetable. At his Cream Hill garden was a stand of this fern large enough to permit cutting of the fuzzy young fronds for blanching and freezing in April and May. The original clumps had been moved to the north side of the old barn some twenty years before and despite annual harvesting showed no need for feeding or replacement. The curious, curled, bright green fiddleheads are always a highlight of one of his wife Ruth's delectable out - of - the - garden and freezer meals served with melted butter and I think a breath of garlic from a Mouli garlic press.

It was exciting to watch the variety in size of fern fronds unfold in the folklore fern corner of the garden this spring. Some were very densely furred in tawny fuzz and others were just thread-like, almost red, crooks rising from the old winter-flattened foliage. As they grew and, in some cases, fruited I was reminded of the stories of fern seed rendering the bearer invisible. No wonder the ancients thought there was something magical about the fine dust that is wafted from the tiny spore cases on the backs of the leaves. One way to catch the wonder-working seed was to take twelve pewter plates to the spot where ferns grew. Supposedly the tiny grains would fall through the first eleven plates and could be caught in the twelfth. The bearer of the seed could discover hidden treasures, foil witches and do other remarkable feats.

Finally in July there arrived in the mail the greatest aid to fern fanciers that has ever been published, Boughton Cobb's *Field Guide to the Ferns*, illustrated with over five hundred drawings by Laura Louise Foster. I rushed to the fern corner with the book in hand and discovered that I had collected ostrich fern (next spring it should be big enough to use some of the fronds, carefully removing the fuzz after blanching them), lady fern, polypody, interrupted, and Christmas ferns.

By means of the keys and the remarkably detailed, life-like drawings it was easy to sort out the species on hand. Now I look forward to more trips to the woods to identify but not collect the rarer treasures for which our limestone section is famous. In a chapter on fern gardening I learned that transplanting the plentiful species in the fall is a good idea, but that the unusual ones should be grown from spores. Maybe I shall try this new indoor hobby, more fascinating than terrariums, thanks to Houghton Mifflin's getting out a fern book in their famous "Field Guide" series.

GERTRUDE B. FOSTER

BOOK REVIEWS **(from page 166)**

Lawns and Landscaping Handbook will have fundamental and detail information on improving their lawns and plantings.

Soil improvement is emphasized for the new and existing lawn. Emphasis is placed on using good soil in starting seeds and in propagating and planting shrubs and trees.

Proper surface drainage and the correct usage of tile to remove water that collects at a depth of eighteen inches to two feet under the soil are outlined in detail.

The value of soil testing, and information on how and when to apply both lime and fertilizer when constructing a new lawn, if followed, will insure success for new home owners who have to build a lawn.

Information on how and when to use sod on certain areas and what grasses may be started by the use of stolons, plugs or sprigs is given in detail.

Grass will grow in shade if fescue and *Poa trivialis* seed are started properly. Turfgrasses on banks will perform with satisfaction, if they are mowed higher than are grasses on level areas.

Grub control by the use of different insecticides from arsenate of lead to heptaclor is described so that lawn owners will know how much to purchase and when to make the application.

The brownpatches, dollarspot, slime molds, leafspot, fertilizer burns and, yes, even fuel oil spills, are all defined so that their injury may be determined—even information on how to check the disease or correct the injury is given.

In addition to telling in simple language a plan of action for having a better lawn and properly planting the home grounds, the Handbook has an array of action pictures and descriptive drawings that will be helpful to both new and veteran gardeners.

Weeds and grasses are pictured; then crabgrass is discussed and proper chemical treatment is outlined.

There is correct information on watering of lawns. The shallow root system resulting from frequent, light waterings is pointed out; which sprinkler to use on different size lawn areas is outlined.

Before you purchase the new mower, read the chapters on "Lawn Mowers and Know-How of Mowing." Any of the thirty chapters may be read separately. If a tree-planting project is contemplated, the home owner may sharpen his planting techniques by reading the chapter on tree plantings.

The slightly more than one hundred pages of pictures and readings on lawns and landscaping may be quickly read and often referred to—a reference guide for the home owner on having more pleasant living surroundings. Again, the facts about the preparation and care of the soil is fundamental. After reading how to improve the physical condition, properly add lime and soil nutrients, prepare the seedbed, then select the proper grass for your lawn and properly manage it, as described in the Handbook, you will be on your way to build and maintain a better lawn.

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